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FROM

W. T. Walsh.

March 21, 1902.

Commonwealth of Massachusetts, Supreme Judicial Court.

Hampden, ss.

HOLYOKE WATER POWER COMPANY,
PETITIONER.

v.

CITY OF HOLYOKE.

BEFORE

EVERETT C. BUMPUS, JAMES E. COTTER, AND
EDMUND K. TURNER,

Commissioners appointed by the Supreme Judicial Court.

APPEARANCES:

For Petitioner: FRANK P. GOULDING AND WILLIAM H. BROOKS.

For Respondent: NATHAN MATTHEWS, JR., ADDISON L. GREEN, AND
NATHAN P. AVERY.

VOL. X.

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BY

FRANK H. BURT, WM. L. HASKEL, AND E. L. DAVIS.

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FORTY-EIGHTH HEARING.

BOSTON, Tuesday, Dec. 18, 1900.

The Commission met at the Court House at 10 A.M.

ROBERT L. WARNER, *resumed.*

Direct examination by Mr. GREEN, continued.

Q. Mr. Warner, if this plant is to be run by steam, whether or not there is any need of that shafting, or at least of all of that shafting, which is in the basement of the present dynamo building? A. There is need of only a part of it—the major part of it.

The CHAIRMAN. A little louder. I heard you, but speak a little louder.

Q. You mean there is need of the major part of it? A. Yes, sir.

Q. That is, as the plant is now run, with the dynamos that are now in it? A. Yes, sir.

Q. In case three generators of the alternating current 2-phase system were in there, directly connected, would there be need of that shafting? A. That is a difficult question to answer directly. If there were three generators there, directly connected, the whole internal plan of the station would be entirely altered. All the shafting and belting, the engines, would all be removed, if there were three directly connected generators in that building.

Q. Putting my question in this form, where directly connected units are used, is there any need of shafting and belting? A. There is not, except to a very limited extent. The small exciters are occasionally driven by a belt—a small belt. Two or three small belts would cover all the belting in the plant, and they might be done away with altogether.

Q. You understand the questions I am asking now are on the supposition that we are running by steam entirely. Do you understand me that way? A. I do.

Q. Will you state what is meant by direct connected units?

A. A direct connected unit is one in which the armature of the dynamo is carried on the extended engine shaft. There is no belting.

Q. In this plan which you submit in connection with your suggestion for a 575 kilowatt plant, do you represent here direct connected units? A. I do.

Q. Will you show us where the engines are placed and where the armatures are placed, and how the plant operates without the use of shafting and belting, unless it is the little belting on the excitors? A. I have drawn, or had drawn, this plan, to show a station of no belting and no shafting whatever, even for the excitors. There are shown three direct connected generating units, two larger ones here and a small one there. These are the cylinders of a cross-compound engine, the generators standing here.

Q. Are the generators marked a name? A. They are marked. This plan, I should explain, was drawn and titled for a 725 kilowatt station. In figuring on a 575 kilowatt station I have used the same arrangement, simply modified the size of the units. With that explanation, I will go on to say that this unit is titled a 300 kilowatt 2-phase alternator. The generator field is shown here inside the engine cylinders—between the engine cylinders—between the engine crank disks. The armature is built on a spider, which is pressed on the shaft and keyed to the shaft before one of the crank disks is put on, so that that rotation of that engine shaft rotates the armature as well as the fly wheel alongside of it. It rotates the armature just as it would rotate a fly wheel; the armature acts to some extent as an additional fly wheel. There is no belting or shafting except the engine shaft itself. Alongside of that is another 300 kilowatt 2-phase alternator. Over here is a 125 kilowatt 2-phase alternator, for light loads, directly connected to a cross-compound vertical engine, in the same way; that is to say, the armature being carried on a spider pressed and keyed on the extended engine shaft. There are three exciter units shown in the upper left hand corner of the plan. One of those is driven by a small steam engine. The other two excitors are driven by induction motors. In starting the plant from a stand-still it is necessary to start first an exciter, and this must be done with a small steam engine. This steam driven exciter unit here would be started first, then one of the main alter-

nators, either one of the two large ones or the small one, started; after that the exciting will be done by one of the motor driven exciters with higher efficiency than if driven by the small steam engine. It is only necessary to use the steam driven exciter outfit when starting from an absolute standstill. When any one of the units is running either of the motor driven exciters can be used. In this extreme corner I have shown the switch board. That answers your question.

Q. Now, in this room which contains the alternators and exciters and switchboard, are there placed all the mechanisms necessary to run the plant as compared with the mechanisms in the present dynamo building of the Holyoke Water Power Company? A. All, with practically one exception, namely, the arc transformers. The series arc transformers would be placed in the basement, that is to say, they would be on the ground beneath the level of the engine room floor.

Q. That is, inside of this room, then, you have the engines that are in the engine room of the present plant, and you have dynamos, and between the engines and dynamos all the work is done which is done in the engine room and the dynamo room of the present plant, except the work of the transformers? A. That is correct. Within these four walls you would have the whole thing.

Q. You have on this same plan represented what else? A. I have shown a boiler room with two batteries of horizontal water-tube boilers. I have shown an economizer for utilizing the heat of the flue gases as much as possible. I have shown a stack here at the lower part of the plan. I have provided a coal bunker of three hundred odd tons capacity facing the boiler room, with entrances in front of the boilers. I have shown at the upper right hand corner an entrance and a space for offices, beneath which would be a small shop, room for supplies, oil, etc.

Q. This plan represents a station of 575 kilowatts capacity. Would the size of the station be altered at all if it was to be 725 kilowatts? A. This plan, as I explained, is drawn for 725 kilowatts.

Q. I mean the station building? A. The same arrangements would be used in the smaller station—slightly smaller station, ten per cent. smaller, about.

Q. Whether or not in your opinion there is any loss of energy in the shafting and belting of the present plant? A. There is a considerable loss, particularly at light loads—a considerable percentage of loss, particularly at light loads.

Q. If I understand you aright, Mr. Warner, without repeating you, it would be difficult to reconstruct the present plant of the Water Power Company so as to use direct-connected units unless you entirely remodel everything? A. It would be.

Q. Buildings and all? Do you say buildings and all? A. I say it would be extremely difficult. The buildings would have to be remodeled to some extent.

Q. Do you remember whether or not the present buildings, the three of them, the dynamo building, the engine room and the boiler room, are on the same level or not? A. As I recall it, they are not.

Q. Does that fact, that they are not on the same level, affect the question of running this plant with direct-connected units? A. That is a question upon which I would hardly like to express an opinion without a good deal more careful thought. It is possible that it would not be a serious objection to the installation of direct-connected units. It might be.

Q. Take it from this aspect, Mr. Warner: If this plant is to be run by direct-connected units, which I understand from you would be more efficient and economical, or, if not by direct-connected units, from the 2-phase alternating current machines you have here, whether or not all that space that they have in the present three buildings is needed or advantageous? A. Very much of it would be of no use whatever.

Q. That is, in 1882, when the Schuyler dynamos were in use, whether or not it was the fact that as you increased the capacity of your plant and added to your business, you added to the number of machines and extended your plant in floor space? A. At that time we did.

Q. What is the state of the science or art now? A. At the present time an extension—

Mr. BROOKS. I assume you mean by that, January, 1898, do you?

Mr. GREEN. Yes.

The WITNESS. Did you address that to me?

Mr. BROOKS. No, I was asking Mr. Green.

Q. Take it January, 1898, and then we may take it now. A. I have considered these plans as of January, 1898, and all my schedules I have prepared as of January, 1898. It is my intention to speak as of January, 1898; and I should say that in January, 1898, the general tendency in central station engineering was a departure from constant current arc dynamos, belt-driven, with different classes of apparatus for power and incandescent lighting service, to direct-connected units, requiring very much less space. That general change got well under way in 1896 and 1897, and very many stations were making such a change, or considering such a change, actively in 1898.

Q. Your upper plan, which is designated "Cross Section," shows the cross-section of the same building that is shown in the lower plan, does it not? A. It does.

Q. What construction have you in the roof of that building? A. That is a truss roof, with tar and gravel cover.

Q. Whether there are any advantages in a roof of that style? A. That roof is strong against the weight of snow; it is practically fireproof; it does not condense moisture on the inside and throw it down upon the machines. It is such a roof as is in very general use in modern stations built in 1897 and 1898.

Q. What is that iron arrangement you have under the roof of the engine and dynamo room? A. That is a traveling crane, a hand crane, for use in handling parts of the engines or generators.

Q. Is there such a crane in the present plant? A. There is not.

Q. Speaking from the point of liability to fire, what can you say of a building of the type that you have outlined there as compared with the buildings of the Water Power Company? A. This building has but one floor, in the engine room. It has no upper floor, no combustibles stored overhead. I should consider the probability of fire very much smaller.

Q. In the present plant of the Water Power Company there is in the dynamo room a second story wooden floor, taking up, as I understand, the entire floor space, and that is used, as I recall, as a repair and work shop. What have you outlined here to take the place of that room? A. I have shown on the upper right hand corner of the plan—

Q. Of which plan? A. The ground plan.

Q. Yes. A. Four walls enclosing a space, the ground floor of which would be used for such supplies, machine shop, etc., as the space upstairs in the existing plant is used for.

Q. Now, that space, Mr. Warner, is obviously very much smaller than the space used in present plant. Whether or not it is large enough to do the work, and if so, why is that large enough, or, to put it the other way, why is the present space of the Water Power Company too large? A. There is a good deal of waste room upstairs in the existing plant. They have a very large amount of apparatus there for repairs, a great deal of old junk up there; I remember seeing, I think, 78 arc lamps there which were out of service, unfit for service, and apparently simply stored there. Much of the space is taken up in that way. This room affords entirely sufficient space for all the proper requirements of a plant of this size.

Q. Are there plants in operation, Mr. Warner, built on the lines that you have suggested there?

Mr. BROOKS. You mean in 1898 or now?

Mr. GREEN. I mean now.

A. I would like to be clear as to whether you mean at the present time?

Q. At the present time? A. There are.

Q. Well, whether or not doing substantially the same business as this 575 kilowatt plant?

Mr. BROOKS. How can that be competent? It raises, may it please your Honors, many collateral questions, and we cannot try each one of them.

Mr. GREEN. I don't know as I care to press it if any great objection is made. My idea was this: I could hear Brother Brooks's ringing voice talking about "ideal plant" in the near future, and I thought I would see whether it was ideal or real.

The CHAIRMAN. I think you had better let it go.

Q. Now, Mr. Warner, if an electric plant is to be operated by water power and by steam, can you use direct-connected units?

A. You could do so on one conceivable plan, but I don't think it ever has been done, and, generally speaking, I should say it would be impracticable.

Q. From what point of view would it be impracticable? For what reason?

The CHAIRMAN. What was the other question?

(The question, "Now, Mr. Warner, if an electric plant is to be operated by water power and by steam, can you use direct-connected units," was read by the stenographer.)

The WITNESS. I answered it, your Honor.

The CHAIRMAN. Yes, I understood you to do so.

Q. Now, I ask you why do you think it would be impracticable? A. In order to use direct-connected units in a plant arranged for driving either by water power or steam, it would be necessary to do something of this nature: You would have to place the dynamos between the water wheels and the engines, and arrange for some method of clutching the dynamo shaft at one end to the steam engine and at the other end to the water wheel. That would be a very objectionable arrangement in many particulars, but it might be done; it is conceivable that it could be done.

Q. Tell me this, where your armatures are directly connected they run at the same rate, do they not, as the shaft of the engine? A. Certainly.

Q. Does the shaft ordinarily of an engine run at the same speed as the shaft that comes from these water wheels? A. These water wheels are vertical. The power is delivered through a horizontal shaft geared to the vertical shaft. Speaking as of these water wheels in the plant, it would, of course, be necessary to employ that gearing in any event. The ratio of speed might be changed to some extent in that way. Of course it would be necessary either to have the speed of the wheels changed to suit the engines or to have the engines built to suit the speed of the wheels.

Q. Do you know at what revolution the wheel shafts run? Do you remember off-hand? A. I don't remember off-hand. I may be able to—

Q. I won't bother to have you look it up, but as I understand you, then, if we had the direct-connected units in a plant using both steam and water power, the shaft from the water wheel and the shaft of the engine would have to be running at the same rate of speed? A. That is substantially correct.

Q. And you don't think that is feasible, as I understand?

Mr. BROOKS. Isn't that a little leading?

Mr. GREEN. I was simply leading up to the next step. I understood the witness to have said that. I did not mean it to be leading.

Q. Now, if this plant was to be adapted to an alternating current single-phase transformer system, and water and steam both to be used, how would you run your generators? A. If I were to adapt this plant to an alternating current, 2-phase system—

Q. I meant 2-phase. A. I assumed that you did—I should probably use belt-driven generators.

Q. If you were to use belt-driven generators and were not to use the water plant, but to run by steam alone, how much shafting and belting would you need? A. You mean with the 2-phase alternating current plant?

Q. Yes. A. I am obliged to make a number of assumptions in answering that question.

Q. Very well. A. I may assume that you desire the question answered with relation to the use of the two engines which are in the existing plant, simply modifying the electrical end of it. If that is your question, a very great deal of the existing shafting and pedestals and clutches and belts would be done away with, principally because there would be fewer machines to drive,—three, say, as against 26. At present the shafting and belting equipment is intended to enable one to drive the generators or any of them from either engine or from any wheel.

Q. Now if I understand you right, Mr. Warner, and I ask you this to be sure that I do, all that you have said is on the assumption that we use the same engines, but simply re-form the dynamo room by the substitution of 3 machines for the 26 or 30 that are there? A. That is the assumption that I made.

Q. Assuming that a change was made in the engines, could any saving be made in the use of belting and shafting? A. I believe your question which leads up to this involved the use of steam alone.

Q. Yes, I am talking about that now. A. If I considered the use of steam alone and considered the removal of the existing engines at once or at the same time when the electrical system is remodelled, I should certainly use direct-connected generators and engines, with no belting whatever and no shafting.

Q. Well, then, if I understand, if you permit the present engines to remain, or should consider it wise yourself to run with the present engines, you would use belted units? A. I should.

Mr. BROOKS. What do you mean by belted units?

Mr. GREEN. We speak of units as referring to the dynamos and armatures brought together, and belted units would mean running them by means of belts from the engines, while the direct connected ones are put right on the shaft.

Mr. BROOKS. They are run from the engine shaft?

Mr. GREEN. The direct-connected go right on the engine shaft.

Mr. BROOKS. From the machine shaft?

Mr. GREEN. It is the same shaft. The machines run on the shaft of the engine, which saves all the intermediate appliances. If you use belted ones, that means that they run by belts, as I understand it. I do not claim to be an expert myself.

Q. But in case the water power is used in connection with the steam and you use your 2-phase system belted, whether or not you could get rid of this shafting that you would get rid of if you ran by steam alone? A. You would get rid of a considerable amount of it; so much of it as involves the driving of 26 machines from two sources of power as compared with driving three machines from two sources of power.

Q. Let us go into the boiler room for a moment, Mr. Warner. Is there any need of a boiler room of the size of the boiler room that they have at the present plant? A. I am hardly prepared to say that the existing boiler room is too large for the needs of the plant, considering the importance of storing coal. If the hand-to-mouth policy of using coal be adopted, a certain amount of the room is superfluous.

Q. I noticed that in the plan that you had drawn here you provided for a coal bunker on the outside, separated by walls from the boiler room, if I am right in interpreting your plan? A. I did.

Q. In connection with the present plant you would store the coal where? What is your idea in the storage of the coal, as you mention it in connection with the boiler room? A. As I recall the existing boiler room, there is room there for the storage of some coal. There are no bins and no conveniences provided, but I believe that there is room for storage of some coal.

Q. Whether in remodelling the present plant for the purpose of putting in a 2-phase system, any of the present shafting and belting would be of use? A. On a belted plan employing both powers a good deal of it would be of use.

Q. But in case of direct-connected units, if I understand you aright, there is no need of it at all?

Mr. COTTER. I did not hear that question, Mr. Green.

Q. As I understood the statement in regard to the direct-connected units—what would you say if direct-connected units were used? A. That involves a departure from water power to direct-connected steam units, and in that case there would be no belting or shafting required.

Q. What have you to say of the present engines of the Water Power Company for use in case the plant is to run by steam alone? A. They are simple engines run non-condensing, of size very large for the average load and for the day load. Their consequent average steam consumption is very high,—very high compared with a new and modern plant as of January, 1898; much higher than many electric plants driven by steam, built long before 1898.

Q. Will you tell us what you have provided for engines in the plan that you have outlined there? A. I have provided two cross-compound engines to be run condensing. I have provided a smaller cross-compound vertical engine to carry the light loads. In the existing plant, or under the loads on the existing plant, there are a good many hours in the day time when a very small load is carried—a load very much too small to put on a 250 kilowatt generator.

By Mr. BROOKS.

Q. Excuse me a moment. Do I understand that you provide two engines and a smaller engine, making a third engine? A. That is correct.

By Mr. GREEN.

Q. When would you use that small engine? A. At times of light load.

Q. If the present plant was to be run by steam alone would it be necessary, in your opinion, to do anything to the engines? I mean necessary from the point of economy in operation? A. If the plant were to be run by steam alone it would probably be of advantage to operate it condensing; that is to say, to install condensers and piping, and either install a cooling tower or take water from the canal, as might be most practicable—the cheapest.

Q. Would you compound these engines? A. I would not.

Q. Why not? A. They are already very large for the average load, much too large for the light load. If compounded, it would have to be done at very great expense, and at light loads their efficiency would be much lower than it is at present.

Q. When you say they are much too large for a light load, what do you mean? A. I believe the minimum load at the present time is about 10 per cent. of the normal capacity of those engines at the existing steam pressure.

By Mr. MATTHEWS.

Q. Of one engine or both? A. One.

By Mr. GREEN.

Q. How many horse power is that—about? A. About 45 horse power.

By Mr. BROOKS.

Q. That is, you understand that the present minimum load is 45 horse power? A. That is what I understand.

By Mr. GREEN.

Q. Is that the useful load? That is, is that the load representing the output, or does that include the power that goes in friction and in the shaft? A. That is indicated horse power in the engine cylinder. That is to say, it is the horse power which would be shown by an indicator test at the cylinders of the engines. There is a loss, a mechanical loss, by friction in the engine itself, due to the work of carrying the parts of the engine; a loss in the belts and in the shafting. This 43 indicated horse power, I believe, was taken from figures which Mr. Main obtained, and I think it largely represents friction.

Q. Well, now, to come down to the concrete of that, supposing that that is the power used at the minimum load, wherein is the disadvantage in running these engines by such a load, and wherein is the advantage in having a smaller engine to use? A. The larger the engine the more work there is to be done on the parts of the engine, in moving them, all the time. If the useful load on the engine be very small the ratio of wasteful load to useful load is very high; the efficiency is very low. Now, when there is a load on the plant varying from 45 horse power up to perhaps 100 or 125, a 150 horse power engine will run with a very much less consumption of steam per horse power an hour than is at all

possible with so large an engine. The condensation of steam in such a large engine is very much greater than in a small engine.

Q. You spoke of a cooling tower. That is, as I understood you, you assumed that you take the water from the canal or that you have a cooling tower. What do you mean by a cooling tower, what service does it do and how does it work? A. A cooling tower may be in one of several forms. A very common form of cooling tower employs condensers of the same type as would be used if condensing water were furnished from the canal. The cooling tower receives the water from the condensers and cools it off, discharges it into a well or cistern, from which it is pumped or drawn again into the condensers. The water for condensing is circulated in this way and used over and over. That is, the cooling tower enables you to operate a plant condensing without being located adjacent to a supply of water—a large supply of water.

Q. Is the work done by the condensing tower as effectual in its results as that done by ordinary condensers? A. Engineers differ somewhat as to that. The weight of opinion, I believe, is that, under favorable conditions, a cooling tower will save just as much coal as will condensers, or just as much steam as will condensers, operating with a sufficient supply of cooling water. The condensers must be a little larger for use with a cooling tower than for use with an ample supply of cool water.

Q. What power does it take to run a cooling tower as compared with running a condenser? How does the power required for one compare with power required for the other? A. The steam required for the condenser may be, and probably is, primarily a little more in the case of the condenser used with—a very little more—in the case of the condenser used with a cooling tower than in the case of a condenser with a sufficient supply of cool water. A small amount of steam may be used, and is in some types of towers used, for driving a small engine which runs a fan for driving air through the tower. It is customary to employ the exhaust steam thus received from this engine in heating the feed water. The loss is very slight—the net loss is very slight.

Q. Now will you turn to page 31 of your schedule. It is headed, "Schedule E, Water Plant, Apparent Depreciation." That is applicable, I understand, to the present water plant? A. It is.

Q. "Head Gates, Wheel House, Tailrace, etc., 2 1-2 per cent." That is 2 1-2 per cent. for what space of time? A. Per annum.

Q. And you have taken the same rate for the wheels, casing and shafting. Why have you taken that rate? A. I considered depreciation as a factor of the term of usefulness of the thing, whatever it be. It involves wear and tear, the action of the elements, the necessity for extensions due to various causes. My view of depreciation has been that if the first cost be taken and the removal value at the expiration of its term of usefulness be taken, the difference is the net cost of the thing, and that difference disappears altogether in depreciation during the life of the machine. That disappearance in value does not take place the day the thing is taken out or replaced. No one can tell whether it actually takes place proportionately year by year over the whole term of usefulness. But the only practical way to handle the question of depreciation is to charge off per annum a proportionate percentage of the net useful investment in the machine. That is the method I have followed in assigning these percentage depreciations.

Q. Why did you take 2 1-2 per cent. as the per cent. in this case? A. I took that per cent. in the belief that the head gates, wheel house, tailrace, wheels, casing, shafting, etc., would be likely to have a net term of usefulness averaging not over forty years—averaging about forty years.

Q. And you take the per cent. for the year and multiply by the number of years and get the total, obviously, from this table? A. I do.

Q. Now this table, as I understand, on page 31, is applied to your results in schedule A on page 1? A. It is.

Q. Found in column "d," Apparent Depreciation to January, 1898. A. It is.

Q. Turn to page 32, the next page. This is Schedule F. I would like to have you explain your rate of 6 per cent.

The CHAIRMAN. Doesn't he go on the same principle he did on the other?

Mr. GREEN. I wish to ask him why he takes 6 per cent. in the case of the boilers.

A. This Schedule F, page 32, is based on a consideration of the plant—steam and electric plants—under conditions of inter-

mittent use of the steam plant as at present employed. Under those conditions, with only occasional use of the steam plant, a few days each year, if it were properly inspected and kept in such repair as it should have, I believe the depreciation on the boilers would not exceed 6 per cent. per annum.

Q. You have estimated this depreciation as under intermittent use. Does your next schedule, Schedule G, take up the question on the supposition that it is used continuously? A. It does.

Q. You think the rate of depreciation would differ under the two conditions? A. I believe it would.

Q. Differ in the items 2 to 7?

Mr. BROOKS. You are on the 33rd page, aren't you?

Mr. GREEN. Yes, sir.

A. Yes, sir.

Q. In column 1 on page 33, you have blank spaces, beginning with item 8 down through item 15. The totals are carried out in the per annum. Are those the same as in Schedule F? A. They are, yes, sir.

Q. Coming to Schedule H, that deals with a plant of 725 kilowatt capacity. That is page 34. What is your conclusion in regard to the present plant run either by steam alone or by steam and water, so far as depreciation is concerned, and a new plant, taking first the 725 kilowatt capacity; which has the greater depreciation? A. The percentage of depreciation, I believe, will be very much lower in the case of a new and modern plant.

Q. Now why? Will you explain to us, Mr. Warner, why, in the case of a new and modern plant of either 725 kilowatt capacity or 575, the depreciation would be less than in the existing plant? A. The plant is more compact; there are very many less small moving parts; very many less journals and belts to be kept up and to wear out. The art itself has advanced tremendously as between the old plant and a new and modern plant. That of itself would account for a very great difference in the matter of depreciation.

Q. In getting at the apparent structural value of the plant as shown in your various schedules and in the use of your depreciation tables, have you depreciated for anything except the age and condition of the various parts that you have dealt with? A. I

have attempted to do so. I have attempted to fix a rate covering the depreciation due to all causes. It is manifestly impossible to fix such a rate very closely by a pure examination of the plant, without comparing the plant with a new and modern plant as of today, without a comparison of its operating expense. That is the final test and the true test of depreciation. That is why I call this depreciation "apparent depreciation."

Q. Then, if I understand you right, so far as you could as you went along, you attempted to allow for depreciation for advancement as well as age and condition in the various parts as you took them up one by one? A. I did, yes, sir.

Q. Then you made a further test of your result by finding out what it cost to operate this plant? A. I did, yes, sir.

Q. Whether or not you valued this plant part by part in your various schedules in operation, or gave it a value dependent upon the separated value of the separate parts? A. The apparent values arrived at in this way are intended to represent the apparatus together, in use.

Q. Returning to page 31 for a moment, and using your depreciation of 2 1-2 per cent. as an illustration, referring to your statement also that you assumed forty years as an average of the probable life of the parts, whether or not you have dealt with that as money to be paid into a sinking fund and compounded, or not? A. I have not.

Q. Why? A. For the practical reason that companies in the electric lighting business do not maintain sinking funds.

Q. Are you familiar with the practices of electric lighting companies in this respect? A. I am.

Q. Whether of many or few? A. A great many.

Q. Is there any further reason that you desire to give in that direction, any further explanation? A. I would be glad to explain that further.

Q. I should like to have you. A. I believe many companies well managed treat that question as I have treated it here—substantially as I have treated it here. Some of them let the matter of depreciation run along a year or two, or three years, then they will invest a considerable sum of money in some extension and either write it off altogether or write off some other part of the plant,—cover the thing in a lump sum—at the end of a year or at

the end of two years or at the end of three years. That has been frequently done. The principle followed by the management of many of the companies is the principle I have used here—to charge off from the gross income an average amount covering the average impairment in value of the property. That money taken out of the gross income is not put in the bank at compound interest as a sinking fund. Sometimes it may accumulate for a year or two years or three years, and then be spent—that is to say, re-invested. That is to say, the money taken out to cover depreciation for two or three years is re-invested, so that the capital assets of the company are maintained intact and unimpaired. If all the income be paid out and the plant continues to wear out the company eventually will get on a false basis with its stockholders; the capital will be paid out in the form of dividends.

Q. If the earnings are invested in the plant, why do they not earn interest? Why does not it amount to the same thing as compounding it? A. The interest which it earns is returned to the stockholders year by year in form of dividends. It is not left in the bank to be compounded, as is done in the case of a sinking fund.

By Mr. BROOKS.

Q. That is, you take this at simple interest? A. You might put it that way. That is rather a departure, I think, from the idea I had in mind.

By Mr. GREEN.

Q. Have you considered any interest at all in connection with the proposition of 40 years' life and 2 1-2 per cent. a year charged off? A. I have not.

Q. Turning to page 35 and to schedule I, you deal with fixed charges and first with the water plant and then later on for the steam and electric plant. Inasmuch as these charges play some part in your arriving at your valuation of these plants, will you explain your fixed charge items, particularly the interest charge, why you select the rate that you have selected there?

The CHAIRMAN. I would like to have him go through the whole of one as a sample.

Mr. GREEN. Yes.

Q. Take up the very first one. A. I consider under the heading "Fixed charges" all the items of—

By Mr. BROOKS.

Q. Which page are you taking up now? A. Page 35.

Mr. GREEN. Page 35, Schedule I.

A. I consider under the heading "Fixed charges" all the items of operating cost which are not labor or material, purely, or general expense not primarily contingent upon the value of the plant itself. "Fixed charge," in other words, is primarily a factor of the market value of the plant.

By Mr. BROOKS.

Q. Mr. Warner, excuse me just a moment. I see you have this headed "Rates for water power." A. Yes, sir.

Q. "Rates for steam and electric plant," in J. I suppose those mean for the two present plants, do they not? A. They do, yes, sir. On the succeeding page you will find two more schedules, I believe.

Q. Those are for the two existing plants? A. The one at the top, schedule K, is for the existing plant.

Q. Yes, that is right. Schedule L is for a new and modern plant.

By Mr. GREEN.

Q. Your depreciation—I think I can put a direct question that might be leading but will shorten it up—that 1.86 per cent. that you have taken for depreciation is the rate that you have figured on on page 31, in schedule E? A. With this slight explanation: in computing the apparent depreciation to January, 1898, I have, of course, omitted the question of real estate. The real estate does not depreciate, presumably—it generally does not depreciate—but I say that the apparent depreciation per annum amounts to a total of 1.86 per cent. of the apparent total structural value January, 1898, and that percentage is based upon the value including real estate.

By Mr. BROOKS.

Q. That is, that is your 2 1-2 per cent., and including the real estate makes it 1.86? A. Reduces it to 1.86. That is done in order to arrive at the rates shown in Schedules I, J, etc., and in order to arrive at a rate at which we may consider the whole property; that is where that 1.86 comes from.

By Mr. GREEN.

Q. What is included in the maintenance? A. I have allowed for maintenance—

Mr. BROOKS. May I ask one question, Mr. Green?

Mr. GREEN. Certainly.

Mr. BROOKS. And then you will repeat yours.

By Mr. BROOKS.

Q. How much real estate did you include in this item of 1.86 per cent.?

Mr. GREEN. That is shown, Mr. Brooks, on page 2.

Mr. BROOKS. That is what I was looking for.

A. Please refer to schedule A, details, page 2, item 1, at the top of the page: "4,960 square feet of land at 75 cents per square foot, \$3,720."

Mr. BROOKS. I see; thank you.

By Mr. MATTHEWS.

Q. That is for the water plant alone? A. Yes, sir.

By Mr. GREEN.

Q. You are dealing with the water plant here? A. I am.

Q. Now my question was, what do you include in the maintenance? A. By "Maintenance," I refer to the ordinary running expense of keeping the plant in repair for use. That is to say, if the roof leaks it must be shingled, if an armature burns out it must be re-wound. "Maintenance" covers these ordinary repairs.

Q. The item of "State and county taxes" explains itself; will you explain your interest rate now? A. The total, 3.86, properly covers what I call fixed charges. I regard interest as a separate item from fixed charges. I regard interest as interest. I have used this figure of 8 per cent. interest solely for the purpose of comparing the relative value—the relative market value—of two physical properties: one, a new and modern plant which we could build; the other, the existing plant; my position on that point being this: I consider that I am not called upon to take up the question of earnings at all. I consider that the city has determined to have a plant; that my advice is not asked as to whether they shall have a plant; they have determined to have one.

By Mr. MATTHEWS.

Q. Have a plant, or the plant? A. Have a plant.

Q. I understood you to say the plant. A. No, a plant. The thing which I must consider is, which of two plants is the more valuable, has the greatest market value, or what their balancing market value is. And for that comparison I say that if there be here an existing plant worth, for instance, apparently \$100,000, and a new and modern plant costing one hundred and seventy-one thousand odd dollars, the greater investment in the new and modern plant is only justified by a fair assurance of savings which will afford a net return of 8 per cent. upon the increased investment. That is the balancing value, as I consider it. And for that purpose solely have I used this percentage.

By Mr. GREEN.

Q. That is, it is a question whether we will say \$100,000 should be invested, for instance, in one plant, or \$171,000 in the other, and you consider it for the moment from that point of view? A. That is exactly correct.

(The answer beginning "The thing which I must consider is." was read at Mr. Brooks's request.)

By the CHAIRMAN.

Q. That is, you charge a higher rate of interest because you think the new plant would be worth more than the old plant? A. That is not quite the idea, your Honor.

By Mr. GREEN.

Q. You use the same rate of interest in both cases, do you not? A. For comparison solely, I use the rate of interest of 8 per cent, in the belief that if I be asked to advise concerning an increased investment, I should say, "You are only justified in spending \$71,000 more by the assurance of savings which will give you a net return of 8 per cent. on that investment."

By Mr. MATTHEWS.

Q. You use the same rate per cent., then, for both plants—
A. I do to that extent, yes, sir.

Q. For the purpose of this comparison? A. For the purpose of this comparison only, to determine their relative value.

Q. That is, for the purpose of this comparison you estimate

your interest at 8 per cent. on both sides of the comparison? A. I do.

By Mr. GREEN.

Q. These tables are leading up to a computation—

The CHAIRMAN. I see the next three tables, Mr. Green, are practically the same as the first.

Mr. GREEN. Yes, sir, except in schedule J.

Mr. BROOKS. May I ask—

Mr. GREEN. We have no objection to your asking anything, Mr. Brooks, to make everything clear.

By Mr. BROOKS.

Q. I want to ask this, Mr. Warner, either of you or counsel on the other side; in your 8 per cent. assumption you are assuming that there is no business established? A. That is hardly true. I am considering the plant as running, as doing business. I am attempting to give it a value as a physical thing, complete, running, doing business; but I am not considering the earnings as an element of value.

Q. That is, you do not consider the business in money value? A. I should say not.

Q. And do I understand you that you consider both plants running? A. That is the way I have taken them, yes, sir.

Q. In the same place, at the same time? A. One of them in the existing location; the other, two miles above the city, on the river.

By Mr. GREEN.

Q. Is there any reason why the other plant, for instance, could not be put right on this lot, providing you had water for condensing?

The CHAIRMAN. I do not see, Mr. Green, why you want to go into that.

Q. I mean, is there anything about this plan in its structure, shape, form or anything else, that would prevent its being built on the present site of the Holyoke Water Power Company?

The CHAIRMAN. He can answer that question if it is of any consequence.

A. I am unable to answer it from the data which I have in mind at the present time. It may be that the shape of the land would not be suitable for the plans which are drawn here. Un-

questionably this plant could be put upon the land there is there in a properly shaped building. It may be that this identical building could go on.

The CHAIRMAN. Now, Mr. Green, you are coming to these other schedules, J, K and L. You say there is a difference; what is it? He has answered as to I. If the examination of I covered it all, why not pass to something else?

The WITNESS. Those schedules are all constructed on the same principle, but referring—

By the CHAIRMAN.

Q. They differ in amounts? A. Yes, they differ in this respect, your Honor,—the first one is for the water plant.

By Mr. MATTHEWS.

Q. Which one? A. Schedule I is for the water plant alone. Schedule J is for the steam and electric plant, intermittent use.

The CHAIRMAN. Yes, I see.

The WITNESS. Schedule K, steam and electric plant, constant use, water plant excluded. Schedule L. new and modern plant.

By Mr. GREEN.

Q. They differ, as I understand it, in the depreciation charges, and to some extent in the fire insurance charge? A. They do, yes, sir.

The CHAIRMAN. It is very evident why they differ in depreciation, because the tables prior to this show the reason.

Mr. GREEN. Yes.

Q. Schedule I—does that refer to the 575-kilowatt plant? A. It does, yes, sir.

Q. Now we come to schedule M, which refers to a new and modern plant of 725-kilowatt capacity. Why have you considered a plant of that capacity? A. I began the consideration of the question of a new and modern plant by determining what sort of a plant I would be disposed to build in January, 1898, for all the needs of that locality without reference to the capacity of the existing plant at all. And I chose to put in two 300-kilowatt units and one 125-kilowatt unit, aggregating 725 kilowatts. When I came to consider a comparison of that plant with the existing plant, I took into account the fact that it would be unfair to com-

pare the operating expense and the fixed charges of a 725-kilowatt plant with a plant of the capacity of the existing plant. Therefore I constructed a second schedule as showing the cost and operating expense of a new and modern plant of the same nominal capacity as the existing plant, which is shown in schedule N.

Q. Now if I may put questions which are in their nature leading—if not objected to I can perhaps shorten this. On page 37 you have your labor for the 725-kilowatt capacity plant, consisting of your engineers, firemen, helpers, and so on; and I notice on page 40, which deals with your 575-kilowatt plant, that you have the same labor? A. I have, yes, sir.

Q. I notice that the material charge is the same for the two plants? A. It is, yes, sir.

Q. That your general expense, which takes in superintendence and office rental and clerks, and so on, is the same for the two plants? A. It is.

Mr. GOULDING. What pages?

Mr. GREEN. Page 37 deals with the 725-kilowatt station; page 40 with the 575. I was calling attention to the fact that labor, material and general expense are the same for the two plants, and inasmuch as that brings us to the point of difference and it is within a minute of one o'clock, I suppose we may just as well stop here.

(Noon recess.)

AFTERNOON SESSION.

Mr. GREEN. May it please the Commission, we have a request to prefer, in which we hope our friends on the other side will concur. We would like to have the Commission, at the close of the session, if possible, this afternoon, or tomorrow afternoon, go out to Woburn to inspect an electric central lighting station there, apropos of the suggestions which we are making, and of the plans we offer and of the terms that are being used in our case, relative to 2-phase instruments, generators and direct-connected units, in order to bring to the attention of all in a concrete form the argument which we introduce. We think it would make our proposition much more clear and would lead to a very much better understanding of our argument.

Our position has been this. I remember going with this Commission to an electric light plant at Holyoke and seeing there large buildings, of what we call good mill construction, brick well laid, large timbers, a good many machines in somewhat mysterious operation, and everything laid out on an apparently large and generous scale. We ask you now to believe, and we wish to convince you, that this is not good practice; that it is not to be valued in accordance with what it cost to build it. We are going to ask you to believe that the contents of that dynamo room are second-hand stuff—old junk. We shall ask you to believe that we cannot afford to run the plant with that stuff there—we cannot if you award it to us. It is useless to us for any purpose except to get rid of. The station must in a measure be remodelled and reorganized to bring it down to present practice and efficiency. We submit, from various witnesses, schedules and plans; but one has to use his imagination somewhat in connection with a schedule or a plan, and we have something here which in a concrete form illustrates the thoughts which we desire to suggest. We only want it as an illustration. I know that after I had worked a great many weeks—not days or hours—I found it necessary to go and look at some lighting stations to fully compre-

hend what was meant by this, and to fully appreciate what the savings were at the various points. And as bearing upon this, I do not know that our friends would have any objection, and I assume if they did not the Commission would not, providing we could accommodate the time of all in going. We have arranged so that we have permission to go if the Commission would go with us, and our brothers would go.

Mr. GOULDING. We think it is entirely out of the question. It may be competent for this defendant—it remains to be seen—to conjure out of the imagination of experts a plant, and project it upon the scene, and then compare the value of that plant that never existed with the plant in question, for the purpose of ascertaining its value. On all that branch of the subject we expect to be heard. It cannot be possible that a view can be taken, of other property in other places, with any view whatever, directly or indirectly, to affect the valuation of the property in question.

Mr. GREEN. The capacity of the plant is about the same, the population supplied relatively the same, and there are other similar conditions. But we are not asking it for the sake of having your Honors value in the concrete this plant in comparison with that plant. It simply illustrates what the state of the art allowed to be done, what was permissible to be done, and simply shows to the Commission, and shows to us all, just how an engine and a generator are related, so that we do not need a lot of shafting and belting and pulleys and things to intervene. It shows how, in a simple, compact form, two or three machines do all this work. It illustrates it going as we claim it can and ought to go. In other words, it simply shows the parts and how they operate, so as to better illustrate to this Commission the argument that we have in view when we come to criticise this plant by saying it has a lot of parts which are of no particular value, because they are so expensive to run them in the shape and form in which they are. It seems to me that if the Commission has a right to go—I am disappointed in the fact that our brothers object to it, I had hoped they would not object to it—but if the Commission has the right to go there, and unless you gentlemen have acquainted yourselves with the present state of the practice in electricity, or the state in 1898, it will assist you very materially in understanding the propositions which we advance.

Mr. BROOKS. Do you also propose to take in the other 127 or 128 plants in the State?

Mr. GREEN. If they will shed any light on the proposition there is no objection to seeing them.

Mr. GOULDING. We are here to try this case according to the rules of law. We haven't heard any intimation yet of the legal grounds for supposing that a jury or a court that is trying a case, or a commission sitting on it, can take a view of anything but the premises. I think it is extremely doubtful whether it would be competent for a court to direct a jury to take a view of a running machine for the purpose of seeing how it works. That I have known to be done by the consent of the parties; but it is always done with a precaution that no illustration shall be given to the jury as to how the accident happened or how the thing occurred which is the subject of trial. The jury can go and look at the premises, see anything that is pointed out by counsel, and understand the relation of things. That is strictly confined to the subject matter under debate. If it is something that happened at a particular place they may go and see the place, because the place is involved in what transpired. But the line, I submit, is extremely clearly drawn between viewing the premises which are the subject of trial and doing something else.

I am not going to imitate the example set on the other side, and every time I get up proceed to argue my facts to you, and so I care nothing specially for this interlocutory closing argument we have just listened to, but I confine myself to the proposition of law; and I say further that if this Commission is going to involve itself in the trouble of examining every plant in this Commonwealth, little and big, with direct-unit connections, 2-phase, 3-phase, or whatever other phase, all the plants there are, and form a general opinion as to what is the best average kind of a plant, if it wasn't for the fact that we know from the demonstrations of scientists that the earth is growing old, and will sometime decay and probably stop revolving on its axis and become a dead planet — if it wasn't for that circumstance, we would be willing to consent to it. But for our friends to pick out a plant somewhere which they think fits some theory of theirs, and ask us to go and view it, it seems to me the last stretch of — I will not characterize the action — but it seems

to me to be beyond the power or authority of this Court to grant.

The CHAIRMAN. I think we had better reserve the question, don't you, Mr. Cotter, and talk it over. I don't think we have the right, but we would like to think it over and see; and I would like to talk with Mr. Turner later. There is no difficulty in going on with this witness. We are perfectly willing to go on with this plant we are trying, with the petitioner's experts and the respondent's experts, and have any defects or advantages pointed out. But it seems to me to go to another plant, that the petitioner, by the same token, could ask us to go and see fifty, if they chose to, and we should be constantly traveling around the state. I never knew of a case in which it went to that extent.

Mr. BROOKS. We should propose to make that request of your Honors, to view the other 129 if you thought best to look at one isolated plant.

Mr. MATTHEWS. We would have no objection to any information the Commission could get by an inspection of all the electric light stations in the State.

Mr. BROOKS. And find out what the commercial practice is in this State.

Mr. MATTHEWS. Yes. It has been suggested, if your Honors please, and been reiterated almost ad nauseam, that these plans and plants which are constructed hypothetically by our witnesses, for the purpose of comparison merely with reference to cost, efficiency and economy of operation with the Holyoke plant, are purely figments of the imagination. Now we meet that criticism, if it amounts to anything, by suggesting that there are plants in active operation in this State, just such as this witness thinks ought to have been installed or ought to have been owned and operated by the Holyoke Water Power Company, in January, 1898, before it could claim that it had a good working commercial plant; and we mention this case of Woburn as such a plant. Does the request or the suggestion that this Woburn plant, or any other that might be selected, should be inspected by the Commission, differ materially from the presentation to the Commission of diagrams and plans, as Mr. Davis has done in the case of the gas works and as this witness is now doing on the electric light part

of the case, showing what, in the witness' opinion, good commercial practice would have required in January, 1898, for a central lighting station suited to the needs of the City of Holyoke? We do not ask the Commission to value the Woburn plant, any more than we ask the Commission to put a value upon the plant shown upon Mr. Warner's diagrams. We ask the Commission to take into account the relative efficiency, economy of operation and first cost of such a plant, as compared with the cost to reproduce and the efficiency and economy of operation of the plant actually owned by the Holyoke Water Power Company, for the purpose of determining the value of the latter, and for that sole purpose. We think the view is largely a question of degree. If the Commission can gain any assistance from such diagrams and plans as this witness has produced, the Commission might also gain assistance from an inspection of such a plant in active operation. They certainly would not then be apt to give much weight to the argument on the other side, that these plans and diagrams were simply the hypothetical construction of some ideal and physically impossible plant. They would see a similar thing in active and successful operation.

Then there is the further advantage that, as Mr. Green has pointed out, it would enable the Commissioners and counsel on the other side to understand much more clearly exactly what the witness means when he talks about direct-connected machinery. This whole question of electrical machinery is immensely complicated, and, to my mind, extremely difficult. It presents a very difficult problem. What is a direct-connected, direct-coupled, dynamo? It is pretty hard to understand it, I submit, notwithstanding the very lucid explanation of the subject that has been given by the witness now on the stand. It could, however, be understood in a moment, if your Honors please, if you were brought face to face with a dynamo or electric generator run from the engine shaft, without the intervention of pulleys, belts and similar machinery. It seems to us that from that standpoint, for the mere purpose of getting a clear idea of the class of machinery, of the kind of a plant that we say, speaking through this witness and others, the Holyoke plant ought to be if it is to be valued at reproductive cost or anything like it, such an inspection would be of material assistance to the Commission. It seems to us largely a matter of discretion and degree, whether the Commissioners will

extend the privilege that has already been accorded to our witnesses to construct hypothetical plants, a little further, so as to permit the witness to designate some actual plant in operation, and then inspect it for themselves.

The fundamental objection to this suggestion rests upon the construction of this law entertained by our friends upon the other side. They say that the Commission must value this plant as the aggregate of certain land, certain buildings and certain machinery; that they must take each of the items or component parts of the plant, their first cost if you could get at it, or the cost to reproduce them, or their value considered independently of each other, and add them all together; and they say that is the only way in which this Commission can value the plant. We say that such a valuation would be meaningless; that the resulting figure is the value of nothing; that the aggregate cost to reproduce the component parts of a manufacturing plant is a sum which bears no legal or practical relation to the value of that plant as a whole, as a manufacturing unit, as a going concern. We apprehend that it is the duty of the Commission to value the plant of the Holyoke Water Power Company as an entity, as a manufacturing unit; and that this can only be done by taking into account the cost to produce a manufacturing plant of equal capacity and efficiency, and by a consideration of the relative economy to operate the two plants. That is our idea of this question, your Honor.

The CHAIRMAN. Very well. You may go on with the witness.

ROBERT L. WARNER, *resumed.**Direct examination by Mr. GREEN, continued.*

Q. In considering your suggested plant of 575 kilowatt capacity, we had come to the question of fixed charges, on page 40 of the one, and page 39 for the new and modern plant of 725 kilowatt capacity. I notice in the 725 kilowatt plant your maintenance is 1-2 per cent. on the structural cost. One half of 1 per cent. that is, isn't it? A. Yes.

Q. Isn't there an error on page 40 where you say, "Maintenance 5 per cent. on Structural Cost"? A. That is 0.5 per cent.

Q. That is, there should be a decimal point in front of the 5, should there not? A. Yes, sir. I corrected that in the average.

Mr. GOULDING. Five-tenths?

Mr. GREEN. Yes, five-tenths, the same as the other. One is put in fractions and one in decimals, that is all.

Q. Fire insurance rates you leave the same? A. I do.

Q. State and county taxes at the same rate, but on a different valuation? A. Yes.

Q. And depreciation is the same rate, but on a different structural cost? A. That is right.

Q. I notice that having estimated your operating expense of a new and modern plant, getting a total expense of \$32,842, you add for contingencies, 5 per cent. What do you mean by that? A. I add for contingencies 5 per cent. in the case of a new and modern plant, purely as a factor of safety. I do not know that I can answer that any more definitely than that.

Q. As a factor of safety. You mean by that to account for any omission that might be made by you, any unforeseen expense in operation? A. That is my intention.

Q. Then, having got that total, you add for comparison, 8 per cent. interest. Is that the 8 per cent. which you have heretofore alluded to? A. It is, yes, sir.

Q. As representing the amount of money that you would expect to earn on account of increased investment? A. That is correct.

Q. You get a total charge for operating of \$48,907. Now, to pass to Schedule O, page 41, you take the present steam and elec-

tric plant, you exclude the water plant, and then figure the operating expense; is that right?

The CHAIRMAN. That is apparent.

A. Yes, sir.

Q. In this table, from what sources do you obtain the labor? Is it the labor actually employed, or the labor that you think should be employed? A. It is the labor which would be employed if the plant were run by steam 365 days.

Q. And how are the engines running? A. They are running with the equipment provided by the plant.

By the CHAIRMAN.

Q. As it is? A. As it is.

By Mr. BROOKS.

Q. That is, running non-condensing? A. What is the question?

Q. Running non-condensing? A. They are running non-condensing.

The CHAIRMAN. Then you have "Material," Mr. Green. Is there anything there that you want to explain?

By Mr. GREEN.

Q. In the material that you use there, is your pole line just the same as it is in the present system—distributing system? A. This considers the whole plant as it exists today.

Q. Yes. You figure in your materials and general expense. What have you left out of this computation? A. Nothing but fixed charges.

Q. You have left out the interest also, have you not? A. Yes.

Q. The interest and fixed charges. The \$29,726 on page 42 as I understand, represents then what it would cost to operate the present plant, leaving out of consideration all items of taxes and maintenance and depreciation and other fixed charges and interest rates? A. That is correct, yes, sir.

Q. You subtract \$29,726 from \$48,197. Why do you do that? A. Because the remainder shows the amount which may be applied to fixed charges and interest on the plant without exceeding a total appropriation necessary for the new plant,—for the operation of the new plant.

Q. That is, you used your fixed charge and interest rate added as the capitalizing factor? A. That is the idea.

Q. On that theory, if a purchaser paid \$99,900 for the present plant, and using the same interest and fixed charge rates that you have used backwards and forwards, what would it cost him to operate the present plant as compared with a plant of the character you have outlined here?

The CHAIRMAN. I do not understand why he subtracts \$29,726 from \$48,197.

Mr. GREEN. For this reason, if your Honor please: he has computed first of all—

Mr. GOULDING. Why should we have an explanation from counsel?

Mr. GREEN. Very well. Will you explain again, Mr. Witness? That is very proper, perhaps.

A. That is explained in this way: the item \$48,197 covers the total charges against a new and modern plant—

By the CHAIRMAN.

Q. Including fixed charges? A. Including fixed charges and interest.

The CHAIRMAN. Yes.

The WITNESS. I am able to determine for the existing plant all the charges except fixed charges and interest. Fixed charges and interest depend upon the value of the plant. Having determined all but the fixed charges and interest, the difference between those two figures is the sum which is applicable to fixed charges and interest on the existing plant, to bring it on an 8 per cent. comparison with the new plant. If that be reversed, having arrived at this figure of \$99,900, we may make up a total schedule of charges against the two plants, one on a value of \$99,900, the other one on a value of \$171,400 odd, and the total would be the same in both cases.

By Mr. GREEN.

Q. Mr. Warner, in comparing the operation of the two plants how much money could we pay in fixed charges on the old plant so that the expense of operating it would not exceed the expense of operating the new plant? A. If interest be included in that, \$18,471.

Q. That is, we could pay in interest and fixed charges \$18,471 as an expense against the old plant in order that it should cost us no more to operate it than it would cost the new plant? A. Yes, sir, against the existing plant.

Q. Against the existing plant, I mean. So that it would cost no more to operate it than it would a new plant. That represents the 8 per cent. which you have used on both sides for interest and the 1-2 per cent. for taxes and 1-2 of 1 per cent. for maintenance and depreciation charges and insurance? A. Yes.

Q. Then, this being the old plant, you use, as I understand, the interest charge and the fixed-charge charge, add them together and capitalize this at the rate of the two added together? A. That is correct, and that is summed up in the following pages—43—to make it clear.

Q. Go ahead. A. I have shown there the question reversed. That is to say, having arrived at this balancing value of \$99,900, I may compute directly the total charges against both plants, and they are the same—the figures here are seven or eight dollars apart—they are substantially the same. In the case of an existing steam and electric plant at a balancing value of \$99,900, the total charges, including labor, material, general expense, fixed charges, and, for comparison, 8 per cent. interest on apparent value, the total is \$48,208. For comparison, a new and modern plant, costing \$171,476, will operate under a total charge, including for comparison 8 per cent. interest on that sum, amounting to \$48,187.

Q. Now, will you continue your explanation? As I understand it, at this point you say that you have arrived at a value of \$99,900 or at a sum of \$99,900. Now will you explain still further what use you made of that? A. I consider that a figure balancing one plant against the other on an 8 per cent. basis. In determining the fair market value of the plant some other consideration might—would have to be taken into account. The fair market value is affected by such considerations as the probability of an augmenting rate of depreciation due to further advances in the art. It is entirely conceivable that certain advances in the art now partially developed might cause the existing plant to depreciate very much more rapidly in the next 12 months than the new and modern plant would. A question of that nature must become

a question of judgment and experience. My experience leads me to believe that the fair market value would not exceed \$95,000—that it would be \$95,000.

Q. At this point will you tell us this, Mr. Warner: from the operating charges as you have figured them here, it appears that the new plant can be operated more economically than the old; that is, it costs less to operate a plant such as you have laid out. In as few words as possible, but in your own way, will you tell us the cause of that? A. The causes are—

Mr. GOULDING. Is there some schedule that will assist us about this thing?

Mr. GREEN. No.

A. The causes are probably of two classes. The rate of depreciation in the case of the new and modern plant would be lower, because the art is very much more advanced than it was when the existing plant was built, or at the average time of the building of the existing plant. The electrical industry was in a formative stage when the existing plant was built. At the present time it has settled down, so nearly as we can see, to very good lines of engineering. We believe that the rate of depreciation today on electrical apparatus and electrical plants in general, constructed on modern lines, is very much lower than it was ten years ago, for that principal reason. The other class of reasons is involved in the question of efficiencies of several classes. Roughly, the principal savings in labor and material due to these efficiencies, are produced by the use of compound engines of size suitable to the work and run condensing; by the use of generators direct-connected, without loss in transmission of power from the engines to the generators, as compared with generators of much smaller size and lower efficiency, belt-driven through shafting. Those are two principal reasons. A third important reason is found in the use of a single system of generators for all classes of service. A fourth reason is found in the use of long-burning arc lamps—enclosed arc lamps. That use effects a great saving in labor of trimmers and a small saving, some saving, in carbons. Those are the principal reasons why the new and modern plant will operate for a lower labor, material and fixed charge account, than the old plant.

Q. You alluded to the long burning arc lights. The present

plant of the Water Power Company has open arcs, as I understand? A. It has.

The CHAIRMAN. Has what?

Mr. GREEN. Open arcs; open lamps.

Q. In the plant which you have outlined in connection with your 2-phase system, what distribution system did you plan for?

A. I am afraid I do not understand that question.

Q. Turn to your schedule of your new 575-kilowatt plant. A. The operating expense—

Q. You provide for pole lines, copper lines, and so on.

Mr. GOULDING. What page is that on?

Mr. GREEN. On page 30, and also on page 28.

Q. I want to know what you have provided as a distribution system—don't you call it that? A. Yes, I understand.

Q. What kind of lines; wherein do they differ, if they differ at all? A. Upon page 28, in details of schedule C, there will be found a heading about the middle of the page or lower: "Copper lines. 8." That reads as follows:

"Item 1. Copper lines for general distribution. Average assumed identical with present lines."

Q. What is that average? A. That is to say, I have taken as the cost of copper circuits for the distribution on a new and modern plant a cost of copper equal to the cost, so nearly as I could determine it, of the cost of the copper on the pole lines today. That assumption made in that item 1, that the copper for the new and modern lines, so far as they affected the system itself, would not exceed in cost the copper of the existing system, is a fair assumption, for this reason: the existing plant has a considerable amount of copper provided for low potential circuits—for the 500-volt system, for the 220-volt system—that is to say, for the Edison 2-wire system. The new and modern plant would have no low potential systems whatever, except from the secondaries of their transformers, and I believe that the copper for the new system at 2,200-volts would cost, if anything, much less than this figure. This figure represents to my mind the most it could cost. So I have used \$8,900, and then I have added copper necessary to transmit the current from the proposed location of the new station to a centre of distribution, which is shown in item 2.

Q. Item 2 on page— A. 28.

Q. Page 28? A. Turning to schedule D, you will see that there I did not again work out the details. I have worked them out in schedule C. I use the same total.

Q. Yes. A. That is to say, in providing for a plant of a capacity similar to the capacity of the existing plant I did not reduce the cost of lines below their cost for the plant such as I would prefer to build.

Q. Now, on page 27, Mr. Warner, I find what I was looking for under item 1 of "Electrical Appurtenances," "three 100-lt. alternating current series arc transformers," and "four 50," and so on, "each with full complement of lamps, set up." What kind of lamps do you include in that estimate? A. Those lamps are alternating current lamps, with the tips of the carbons enclosed in a small inner globe, that is to say, they are enclosed arc lamps, so called.

Q. Enclosed arc lamps. Are they in common use? A. They are in very general use.

Q. Can they be used in connection with these Schuyler dynamos that are used in the Holyoke plant for street lighting? A. I have never known them to be so used anywhere.

Q. Now, returning to the point at which I interrupted you, page 44, I think it was—

The CHAIRMAN. Page 45.

Mr. GREEN. Is it?

Q. Well, having arrived at your figure of \$95,000, Mr. Warner, for a fair market value of the steam and electric plants, you introduce a short schedule showing what it would cost to operate on that basis, which amounts to \$47,301. I have a question to ask you in connection with this.

Mr. GOULDING. Where is that?

The WITNESS. Page 44.

Mr. GREEN. Page 44.

Q. It would cost you to operate your new and modern plant of the capacity of 575 kilowatts, \$48,197? A. That is correct.

Q. Now, why—

Mr. BROOKS. Hold on, Mr. Green, will you excuse me for one moment. What page do you find that on, the previous page?

Mr. GREEN. I turned to the resume at the beginning of the

book to get it in mind. It appears, however, on page 40. On page 40 you will find it at the foot of the page, \$48,197.

Mr. BROOKS. Yes.

Mr. GREEN. A question in that connection has been suggested to me, and I want to ask him:

Q. If it only cost to operate this plant on the basis of \$95,000, somewhat less than it would cost to operate your new and modern plant, why is not your figure of \$95,000 an error? A. It is not for the reason that in my mind the probable increment of depreciation due to further advances in the art, etc., would need to be covered by the difference in operating expenses, that is to say, if the operating charges of an old plant and a new and modern plant were identical, a sane, well-advised man would take the new plant. If the operating charges of the existing plant were less, he might take that plant if he thought they were enough less to justify it.

Q. Well, having determined this valuation of your plant, this valuation of the steam and electric plant, how do you study the proposition of the water plant?

Mr. GOULDING. Study the proposition of the water plant?

Mr. GREEN. Yes.

Q. How do you get at the value, in other words? A. I will turn to schedule P, page 45, in order to consider the water plant. In order to consider the water plant I have believed it was first necessary to determine the fair market value of the steam and electric plant. It seems to me that that can be determined, and has been determined, by the comparison I have made. I regard a water power, to a great extent, as a local monopoly, and I believe that most owners of water powers get all they can for the power. The limit of the price they can get for the power is determined by the cost at which any man having the capital can produce his own power by steam; I believe that is true in every case. The value of the power, or the selling price, the maximum selling price of power from the water power is determined, is set, by the cost of manufacturing steam power in that locality. Having arrived at the fair market value of the existing steam and electric plant, and its operating charges, I turn to the water plant and consider it as under several conditions, of bonus and water rental. In schedule P I have considered the proposition that the city pay for the land, all the land, with 16 mill powers appurtenant, \$72,-

ooo. I consider the real estate value of that land at 75 cents per square foot. I deduct that from the \$72,000, and the remainder I call the bonus, namely, \$52,627.

By Mr. MATTHEWS.

Q. You mean, what is paid for the privilege? A. That represents to my mind what is paid for the privilege of using the mill power. It is a bonus paid for that privilege over and above the real estate. I have so considered it. Furthermore, in schedule P I consider a water rental of \$24,000 for 16 mill powers of non-permanent water, with allowances for restrictions, such water furnished according to the terms of the proposition first submitted by the company. That is to say, the furnishing of water except Sundays and legal holidays, with allowances for restrictions.

By Mr. GREEN.

Q. What number of restricted days have you taken in computing these various schedules, P and Q and the following ones?

A. 45 1-2 restricted days, average per annum.

Q. And why did you take those figures? A. In 1898 I made an inquiry upon that subject, or caused such an inquiry to be directed to the officers of the company. I caused them to be asked what the average restrictions upon users of non-permanent power there had been for a period of five years. I received a reply showing that the average restrictions, according to their opinion, had been 45 1-2 days for the five years previous to 1898. That seemed to me to be very good authority, and I used it.

Mr. BROOKS. Do you claim this is competent, Mr. Green?

Mr. GREEN. I do not know why not.

The CHAIRMAN. He can assume it anyway.

Mr. GREEN. He can assume it. Your witnesses have testified right straight along on the basis of what some official of the company has told them.

Mr. BROOKS. I didn't know but the answer might be in writing.

Mr. GREEN. No, I don't know that it is.

Q. If you will consider this proposition for a moment, Mr. Warner: I see on page 45, and I have noticed in other schedules, that you have furnished coal at \$3.75 a ton. Now, will you kindly tell me whether you made any independent investigation

in Holyoke so as to ascertain the price of coal, what kind of coal you figured on, and how you get at that? A. I did so; I made inquiries—

The CHAIRMAN. You need not go into that. You may assume it is \$3.75 a ton.

Mr. GREEN. I desire to bring out what investigation and research he made to ascertain whether it was a reasonable figure.

The CHAIRMAN. We understand he investigated it and satisfied himself.

Mr. GREEN. That fact I mean. I meant I wanted him to answer that.

The CHAIRMAN. That is what I understand him to say he did.

The WITNESS. I would like to add something, your Honor, if I can briefly?

The CHAIRMAN. He took the evidence of other people out in the country; he goes to them and finds out. Now, we don't care who he goes to, unless you desire to put it in.

Mr. GREEN. It may turn out that Mr. Warner has been up there, and that he has had some practical experience.

The CHAIRMAN. Very well, if you desire to put it in.

Mr. GREEN. It has some bearing, because the company has assumed \$4.05 for coal, and that coal item makes quite a difference in the computations. I do not know that Mr. Warner has.

Q. If you will kindly state?

The CHAIRMAN. Go on.

A. I learned that coal, the best quality bituminous coal, had been bought at Holyoke in 1898 at \$3.30 a ton on the cars.

The CHAIRMAN. We do not consider that is competent testimony.

Q. Well, did this come to you through any actual dealings?

The CHAIRMAN. If he had dealings himself, it is all right.

Mr. GREEN. That is what I am asking him, if your Honors please. I happened to know that Mr. Warner had been up there in connection with various mills quite a time, and I was asking the question with that in mind.

Q. Did this knowledge come to you by reason of your connection with any of the mills or in any of your work that you were doing up there, so that it was a matter of actual knowledge on your part, or was it simply what was reported to you?

Mr. BROOKS. It could not be actual knowledge.

Mr. GREEN. I don't know why it could not be.

The CHAIRMAN. If he went up there and asked the question of the petitioners, perhaps it is competent.

Mr. GREEN. I will try to ascertain from the witness what he did.

By the CHAIRMAN.

Q. What did you do, buy or sell coal up there? A. I bought or sold no coal.

Q. What? A. I bought or sold no coal myself.

Q. You went, I suppose, to some one who was in the coal business and asked him the question? A. What I did, your Honor, was this: I had about this time a number of commercial transactions there. I learned of some extensions of some of the mills which were in progress. I made a contract with one of the mills for some work, which contract was based upon their consideration of the value of water power and steam power. I learned at that time what coal was costing them. I had quite an intimate knowledge of the thing at that time.

Q. You have based your statement on what they said to you, haven't you? A. With that explanation, I say I have, yes, sir.

Q. Very well. You put it at \$3.75? A. That \$3.75 is considerably outside of the figure they gave me. I considered it a fair and safe figure to use.

Mr. GOULDING. I don't understand it is any evidence at all as to the price of coal.

The CHAIRMAN. I don't understand that this witness is competent to state the value of coal at Holyoke. He has a right as an expert to put in the figures he has, but you cannot through him show the value of coal in Holyoke. We can easily get testimony on that from other sources.

By Mr. GREEN.

Q. Well, if you will continue, Mr. Warner, with the schedule P. I do not know as there is anything further that needs explanation.

The CHAIRMAN. He says that to pay \$24,000 for the rental, you would get badly "left"; that is about the size of it, is it not?

Q. Where is the result of your computation stated? I think they would get very badly left.

The CHAIRMAN. I do not say that; I say that your witness says so.

Mr. MATTHEWS. It is at the bottom of page 48, schedule P.

Q. You say on page 48, as I understand, that studied in this way that the plant has no value. Allow me to put this question, Mr. Warner: If we are to consider that the water plant would cost the city a bonus of \$72,000, or a bonus of \$52,627 in addition to the valuation of the land, and that a rental of \$24,000 per annum would be paid, whether or not it is suitable for the purpose of its use in connection with the electric light station?

Mr. GOULDING. I object.

The CHAIRMAN. Perhaps you might modify your question.

Q. If a "purchaser" where I said "city"—I thought of that as I went along—if a purchaser were to pay \$72,000 for the land and privilege, and the rental of \$24,000, if he had to—

The CHAIRMAN. As I understand, the witness makes his computation based on \$24,000, \$12,000, \$12,000, \$12,000 on different schedules, running down to page 51, and he produced a debit every time as against the use of the water.

Mr. GREEN. Yes.

The CHAIRMAN. Now, why is not that all you need?

Mr. GREEN. I don't know but it is all that I need, but so far, the results of his work have gone in on my question in regard to the fair market value. Now, while I felt reasonably sure that I had a right to put it that way, a suggestion was made that these figures would be more suitable if considered from the standpoint of the suitability of the use of plant in connection with the electric light station, and therefore I desired to have this stated in connection with that proposition.

The CHAIRMAN. Well, will you put your question. Perhaps I did not follow it.

Q. Whether or not at an expenditure of \$72,000 for the land and privilege, and a rental of \$24,000 a year for water power, this water plant is suitable to be used for the purpose of furnishing power to the electric light plant?

Mr. GOULDING. That I object to.

The CHAIRMAN. Your question is if it is economical enough. That is what you want to address yourself to. Why should this witness be called upon to address himself as to whether it is suitable or not?

Mr. GREEN. Because I think he is competent to do so. I do not think it is necessarily a question of economy. One of our points in regard to this lies right here. Now it is merely a question of whether an expert has the right to testify to it or whether it is a question that anybody can pass upon.

The CHAIRMAN. That is what I am trying to get at. Now you ask him whether it is suitable. It becomes an argument at once.

Mr. GREEN. Possibly; but I do not know just how far an expert in this matter is supposed to have superior knowledge, or how far there might be things in the background which might be comprehended by an expert's testimony. We are following here one aspect of this law, and I tried, as I put my question, to follow the phraseology of the law as it lies in my mind.

The CHAIRMAN. Well, you are asking for something to argue about. You can easily obviate the objection by doing what I suggest. If you desire to insist upon it I would like to hear you.

Mr. GREEN. My point lies right here. We have got these values so far upon this schedule on the distinct proposition of fair market value. Now, I do not want to have it left in that form.

The CHAIRMAN. Why don't you ask this witness, then, what the fair market value is?

Mr. GREEN. We have, and it is answered; that is all covered. But it has been suggested that that answer is an improper one. It has been admitted for the time being, subject to being ruled out, and it was suggested by Commissioner Cotter that there might be some doubt of the witness's qualification to pass on the fair market value, although he had qualified himself to answer whether it is suitable for the purposes of its use. Now I would not want at the end of this case to have this all go out.

The CHAIRMAN. Hasn't he already testified to this very fact?

Mr. GREEN. I do not think he has. I think he has testified to the fair market value—inferentially he may have testified to this, but not in point.

Mr. GOULDING. I did not understand that Commissioner Cotter suggested the idea that this man might testify as to whether it was suitable on account of its value in the market, or its cost; but I understood that the Commissioner at that moment

meant to suggest that this gentleman had qualified himself to tell whether the power was mechanically suitable for the purposes of an electric plant. I did not understand the intimation to go further. If he can go to work and put a value upon the water power plant, which it is entirely clear he is no more competent to do than any other person in any other business, and then, from the valuation which he puts upon it, undertake to say it is not suitable, why, of course he testifies as to the valuation. I do not understand he is competent to do anything of the sort.

Mr. GREEN. I should like to point out a distinction here. When he passes upon the question of suitability, he has not first of all put a valuation upon the water power. If he did that there might some question arise there. He simply assumes the figures which are laid down in the Company's offer, first of all, and determines what it would cost to operate by that, and he determines that at that price we would lose money. I can see strongly the force of the Chairman's suggestion, that the rest of it is clearly a matter that we can all pass upon. But, after all, we may be left at the end of this case with the suggestion that the witness has not testified to this point, and we do not want to be left there; that he has not testified to the suitability of this water power, that he has simply passed on the fair market value. In the second place, I did not understand Commissioner Cotter to suggest the point that the water power was mechanically suitable—

Mr. GOULDING. No.

Mr. GREEN. —or that the witness was to pass upon the question of the mechanical suitability. What we argue is that this power is not suitable for the purpose of its use if it is going to run us in debt, or if it is going to cost much more than we could supply ourselves with power for some other purpose.

The CHAIRMAN. Doesn't anybody know that?

Mr. GREEN. I do not know, I am sure. I cannot say.

The CHAIRMAN. Will you read the question?

The question was read by the stenographer, as follows:

“Q. Whether or not at an expenditure of \$72,000 for the land and privilege, and a rental of \$24,000 a year for water power, this water plant is suitable to be used for the purpose of furnishing power to the electric light plant?”

The CHAIRMAN. My view of it is simply this. As I understand, the purpose this witness has in mind is to undertake to demonstrate that by using the water power there, in conjunction with the steam, there would be an absolute loss; that is to say, it would not be a practicable scheme. Now, you simply asked him to follow that up by asking him to state a conclusion that any sane man could arrive at, it seems to me, demonstrating the fact that there is a loss there, on your theory. Why, it then follows necessarily that that thing cannot be suitable.

Mr. GREEN. On that theory, we are satisfied.

Mr. GOULDING. I do not like to be compelled to argue the principal question involved in this case, or any principal question involved in this case, too often, and I do not propose to be compelled to. Of course the statute has got the word "suitable" in it, relating to property. There is considerable construction possible with reference to the meaning of the phrase, but I do not understand that unsuitability arising merely from the expense or cost of the thing, is a thing that necessarily excludes it. It is possible that there may be property which is a part of the plant, there may be property that is used with the plant, and is suitable for the purpose, but which it would not be good judgment to pay above a certain price for, and that may affect the value of that particular thing. It would be reasoning in a circle to say, simply because you assume a certain value, that it would not be suitable. The two things are not correlated. It may be suitable independent of what it cost to put it there; it may be suitable independent of its value for some purposes; but if you can say, Well, if you take this at a certain price then it is not suitable, but it is suitable if you take it at another price, then you are introducing a question here that I submit this witness is not competent to testify about, and I do not believe any expert can testify about. It will be for the Commissioners to say about that, I take it.

The CHAIRMAN. I simply said "upon their theory." Their theory is that the action of the two together renders this water power unsuitable, or a part of it, or something of that kind. I do not say that I accept that, but I do say if that theory is to be advanced at all there is no occasion for any testimony after they have presented the figures—there is no occasion to follow it up with the expert's testimony.

Mr. GOULDING. I entirely agree with that part of it.

Mr. MATTHEWS. If your Honor please—

The CHAIRMAN. I thought I had disposed of it. I will hear you.

Mr. MATTHEWS. We would like to be heard a little further with reference to the suggestion of Mr. Goulding. I think there is a good deal to be said in favor of his construction of that phrase in the statute which provides that the Commissioners shall exclude all property which in their opinion is not "suitable" to be used in connection with the gas and electric light plant of the Company. There is a good deal of doubt, I think, to speak frankly, whether that expression means that you shall exclude only such property as is mechanically unsuitable to operate the electric light plant, or whether you may also exclude property which may be mechanically suitable, but which is financially unsuitable owing to the amount of money we have got to pay for it, either in cash down or by annual rent. Now, while we admit that that is a doubtful question, our contention would be the opposite of Mr. Goulding's. We shall contend that this Commission must exclude everything from this case, both from the valuation and the transfer, no matter how mechanically suitable it may be, if at the price which they find it to be worth for other purposes, it is financially unsuitable for this purpose. In that aspect of the case, and in view of that possible construction of the clause in question, we think that we are entitled to ask our witnesses point blank whether or not this water power and plant, at such and such a price, would be suitable for running the electric light plant. Otherwise we shall be in this position: That at the close of this case it will be said that we have not put in any evidence looking point blank to the unsuitability of the water power and plant at certain prices.

I agree with what the Chairman has said, that it is perhaps a matter of necessary inference; but so are many other mixed questions of law and fact. Whether or not this water property and power is unsuitable may be a question of law or of inference; but so to a great extent is the question of market value. We ask a witness what the market value is. That involves to some extent questions of law; and so this question may. We do not want to be left at the close of this case having omitted to ask our wit-

nesses whether or not this water power and plant at certain prices are unsuitable for the purpose of running an electric light station. We do not care to have a final discussion of the question now any more than Mr. Goulding does; but upon our theory of the case we submit this question should be admitted.

Mr. GOULDING. That is, I understand Brother Matthews to say he only intends to ask whether it is financially unsuitable.

Mr. MATTHEWS. Yes. I understood that to be Mr. Green's question.

Mr. GREEN. I did not limit it to "financially," and do not think it should be myself—simply speaking for myself. I think this witness has the right to pass upon the question of whether it was suitable.

The CHAIRMAN. We will think it over, and you can go ahead on something else.

Mr. GREEN. I shall consider that your Honors will let us know what you do with it.

Mr. MATTHEWS. We think we are entitled to put the question in the language of the act, without inserting "financially" or any other limiting expression.

Mr. GOULDING. Our objection is that this gentleman is no more competent to answer such a question as that than anybody else who is not an expert at all.

Mr. GREEN. He has already testified that he has, in connection with his electrical work, had occasion to pass and has passed upon the question of whether water power or steam should be used. It is part of his qualifications to determine the expense.

The CHAIRMAN. I supposed you were addressing yourself to the financial proposition here and it did not make much difference whether it was water or steam. For instance, you might have a steam plant there of 10,000 horse power, and that you were claiming that the quality of power that you were going to have there under this offer was excessive, both going beyond what you wanted, and costing too much. That is what I supposed you were driving at.

Mr. GREEN. In effect the logic of it has been that the power to run the plant cost too much.

The CHAIRMAN. That being so, you present your witness with certain data and he undertakes to demonstrate mathemati-

cally that using this power, that you say you have got to take under their offer, is a sort of debt, or, that is, it is too expensive; and from that I suppose you propose to argue it is not suitable, and therefore under the statute you are not called upon to take it. Isn't that the size of it?

Mr. GREEN. That is our argument, but I do not know that I have brought out what I had in my mind. I cannot say here as an attorney—it is possible that our brothers can, or it is possible that the Commission sees more clearly than I do—but I cannot say as an attorney that there may not be something else involved in this thing that we have not alluded to in the figures that have gone forward in the case so far. This gentleman has—and I brought it out myself carefully in his qualifications—testified that he has made a study in many instances in behalf of his clients, as to whether water power or steam should be used. He has considered that from the standpoint of running the plants, and what it would cost to run them. Now I desire to ask him generally, the answer and question being as good as the witness is, backed up by his information—whether, in his opinion, if we have to pay this much money, it is suitable for the purpose of running an electric light station? He has been to Holyoke. He has been over this plant. It might be possibly represented that there is some efficiency in water power that would change the result of the figures on the actual expenses.

The CHAIRMAN. What do you mean by "suitable," financially suitable or what?

Mr. GREEN. I mean to say suitable in any way. I mean generally suitable, whatever the statute means by "suitable."

The CHAIRMAN. Well, the statute is all right, but what have you in your mind when you ask this question of the witness? You say now, having got these figures, this result, showing that you cannot use the water power as you claim. Now is it suitable? I supposed you meant financially suitable. You certainly do not mean to ask him in connection with these figures whether water power is a suitable way of running that property, do you?

Mr. GREEN. No.

The CHAIRMAN. Then you must come back to the financial proposition.

Mr. GREEN. The financial proposition would probably gov-

ern it, but I mean this—to explain it in another way, if I can. Is there anything about that water power used in connection with that electric light plant, under all the circumstances and conditions of the case, if you have to pay \$24,000 rent and \$72,000 down, that makes it suitable?

The CHAIRMAN. Suitable for what? For power?

Mr. GREEN. For power; for running an electric light plant.

The CHAIRMAN. That is all right. We will think it over, Mr. Green. We will let you know before the witness gets off the stand.

Mr. GREEN. I do not want to tie myself down at all in any way. There may be aspects of the case that I am not familiar with.

The CHAIRMAN. Now if you will go ahead with this schedule.

Mr. GREEN. I will pass over schedules Q, R and S, until a later hour.

Mr. GOULDING. Pass them over permanently or temporarily?

Mr. GREEN. Temporarily, until this question is determined.

The CHAIRMAN. Oh, you need not bother about that. Go ahead on the principle that there is nothing in Q, R or S that interferes with that question. Let us dispose of them.

Q. Very well. So far as these schedules are concerned, Q, R and S, you have the same factors involved, except bonus and rental, have you not? A. That is correct.

Mr. GOULDING. Where are you now?

Mr. GREEN. I am speaking of Q, R and S generally.

The CHAIRMAN. Page 52, now, you are on?

Mr. GREEN. Take Schedule Q, first of all, page 49.

The CHAIRMAN. I thought you were going to Schedule T; I should like to understand that.

Mr. GREEN. I did start to go to that, but I came back under a suggestion to take Schedule Q.

Q. That is the same as Schedule P, is it not, except the one item of rental? A. That is so.

Mr. BROOKS. That is on the basis of 8 mill powers?

Mr. GREEN. Yes; on the basis of a rental of 8 mill powers, with a bonus the same as before.

Mr. BROOKS. I understand that ; I so understood it.

The CHAIRMAN. It reads so on the face of it.

Mr. BROOKS. I do not think so. They have got the same bonus but a different rental. They have got a bonus for 16 mill powers and a rental for 8, as I understand it.

Mr. GREEN. That is precisely what your witnesses did, substantially all of them.

Mr. BROOKS. I am not caviling or criticizing. I am simply desiring to understand.

Q. What did you comprehend in your rental?

Mr. BROOKS. I do not gather this in as quickly as the rest of these gentlemen do ; I must say I am stupid about it.

By the CHAIRMAN.

Q. What is comprehended in Schedule Q, Mr. Warner? A. In Schedule Q I dealt with the question exactly as in Schedule P, except that I assumed a rental to be paid, amounting to \$12,000 for 8 mill power.

Q. What did you do in schedule R?

Mr. GREEN. Before we come to R, if your Honor pleases, for a moment—

By Mr. GREEN.

Q. And in Q on that basis there is a loss of how much? A. There is a loss not less than \$6,036. That loss is shown here. There would be a loss greater than that, really, because even if the plant were taken as a gift, taken at no value, it would have to be maintained, depreciation would have to be allowed on it, because it must be renewed. The loss would be greater than this. The loss is shown by these partial figures, at least, this much loss.

Q. And that additional loss is also true as of schedule P? A. It is.

Q. Pass to schedule R. What is assumed in the bonus and rental there? A. I have assumed that 8 mill power be taken, that the price of real estate and the privilege appurtenant of using 8 mill power be \$36,000. I have deducted the real estate value, leaving the bonus \$16,627 ; a rental of \$12,000 for 8 mill power. The result under these conditions is that the water plant has no value for the purposes of operating an electric light plant under these conditions and under this load.

Q. You figure a loss of \$3,166, and would the same arguments

or suggestions which you just made in regard to schedules P and Q apply here? A. They would.

Q. In regard to maintenance. And what is assumed in schedule S in the bonus and rental proposition? A. I have assumed that no bonus was to be paid, that the real estate was to be taken at its real estate value, that the rental should be \$12,000 for 8 mill power. Under these conditions the water plant has no value for the purpose of operating this plant.

Q. The loss being \$1,836? A. At least that, and probably very much more.

Q. Now come to schedule T. Will you explain this schedule to the Commission? What do you assume here, to start with? A. In schedule T I assume that no bonus will be paid, that water will be furnished measured at \$1,500 per mill power for 306 days; that is to say, the average number of days in the year less Sundays and holidays.

Q. Does that \$1,500 bear any relation to surplus rates in Holyoke, or did you assume it from the figures which they gave in their own schedule? A. I took that rate of \$1,500 per mill power 306 days as covering the furnishing of water 24 hours each day for 306 days, and I determined from that the price of which that was the equivalent in horse power per day.

Q. Just a moment. I notice you say here "Water measured." That is, you pay at that rate for such water as is used? A. Such water as is used.

Q. What I asked you was this, Mr. Warner—I do not know myself, but did you take that \$1,500 from the terms of their offer to the city, or did you take it from the surplus rates in Holyoke? A. I took it from the terms of their offer to the city.

Q. Now, starting with that, will you proceed? A. Assuming an average power from the wheel shaft of 65 horse power per mill power,—it would probably be more at times and less at times—this rate is equivalent to 7.54 cents per horse power day. I have determined the average power required throughout the year, the average restrictions, and have arrived at the net number of horse power hours to be used at this rate in the year. This gives the net water charge at this rate, of \$3,713.

Q. That is, is that \$3,713 obtained by using measured water at the rate of \$1,500 per mill power per year? A. It is. Having

arrived at that figure, I have computed the total operating charges of the combined plants, save only fixed charges and interest on the water plant. Those combined charges amount to \$40,850.

Q. Now, if you will proceed, explain the next step in your process. A. The next step, continuing in the same schedule, I revert to the operating expense of the plant by steam, based on its fair market value of \$95,000, including for comparison, 8 per cent. interest, and I find that the figure was \$47,301. I deduct from this figure the partial figure of operating expenses of the combined plants, namely, \$40,850, leaving a remainder of \$6,451.

Q. That is the amount which represents the difference between operating the plant by steam alone and operating the combined plants, if in operating the combined plants you pay a water rental of \$3,713 but do not pay anything for fixed charges and interest? A. That is right.

Q. And is the amount which is applicable—if you will go on and explain that. A. This remainder, therefore, is applicable to fixed charges and interest on the water plant if the water plant is to be considered on a balancing value. This remainder capitalized at a fixed charge and interest rate for the water plant, amounts to \$54,500. That is to say, at a value of \$54,500 for the water plant, it could be operated under these conditions without requiring a total annual appropriation greater than would be required for the operation of the steam and electric plant at a cost of \$95,000.

Q. Before I ask you any further, do you accept this result of \$54,500 as the value of the water plant and privilege? A. I accept it as the limiting value under these conditions. It cannot be worth more than that; it may be worth less. That is to say, the question is, Shall I buy the steam and electric plant at \$95,000, or shall I pay \$54,500 additional to get the water plant? Under these conditions I can pay \$54,500 more and be assured, fairly assured, under considerations of the present, of 8 per cent. interest on the increased investment. This is a balancing value on an 8 per cent. basis.

Q. I do not think you quite answered my question. Do you accept that result of \$54,500, or do you— A. I do not accept that result as the fair market value of the water plant under these conditions.

Q. Why not? A. In determining the fair market value of the water plant under these conditions, I am obliged to consider the undesirability of maintaining ready for service at all times two different classes of power—two different classes of machinery. I am obliged to consider the possibility of a failing water supply—of a decreasing water supply—which would leave non-permanent users with more and more restricted days. Having taken those considerations into account I fix upon a sum which to my mind represents the fair market value of the plant under these conditions, namely, \$50,000.

Q. In treating the amount of \$6,451, which is the amount which you can afford to pay for interest and fixed charges and not have it cost you any more to run the combined plants than it does the single plant, you capitalize at 11.86 per cent. and you say "See Schedule I." That is on page 35? A. Yes, sir.

Q. You are now determining the amount, then, that you can afford to pay for the plant and have your depreciation, maintenance, taxes and interest amount to 11.86 per cent.? A. That is right.

Q. And that 11.86 per cent. equals \$6,451? A. That is correct.

The CHAIRMAN. Now, Mr. Green, I want to understand this, of course.

Mr. GREEN. Yes, sir.

The CHAIRMAN. You would not mind if I interfered with you right here?

Mr. GREEN. I should be very glad to have you.

The CHAIRMAN. Take this schedule T; I see how he figures out \$37,137 and carries it out to \$40,850. What I do not understand is—and probably I ought to—is, what right that gives you to take that amount from \$47,301 and get \$6,451 and capitalize at 11.86 per cent. That part is a thing I do not understand. Of course that is an important part. I do not understand it as well as I would like, and I wish the witness would explain it.

Q. Won't you explain it again?

By the CHAIRMAN.

Q. In your own way, Mr. Witness, what do you mean by taking "operating expense by steam, including 8 per cent. interest on \$95,000, \$47,301"—why do you deduct your \$40,850 from

that, and afterwards, why do you capitalize the remainder in order to arrive at what you think the fair value of the water plant? A. For this reason: \$40,850 includes all the charges against the plant, including the water plant—against the combined plants—except interest and fixed charges on the water plant. The difference is a sum which may be applied to fixed charges and interest on a water plant investment without exceeding the total charges for operation of the steam plant alone. That is to say, it enables us to determine how much we can pay for the water plant and to maintain it under these conditions. The succeeding page—

Q. Probably the chances are I cannot understand it— A. The succeeding page, I think, makes it clear.

Q. What I am troubled about is this—it is undoubtedly the very first thing that I ought to have understood: I cannot understand why you take, for instance, at the bottom of the 52d page and put those two figures together, and then deduct that from \$47,000. Perhaps everybody else understands it, but I do not. That is a very essential thing for me to understand, of course.

A. I believe that I can make it clear. I am endeavoring to compute—

Q. To me you can always make it clearer by illustration than by direct statement. A. I am endeavoring to compute in two columns the annual charges of operating this plant by steam alone, excluding water plant.

Q. How much does that cost? \$37,000?

Mr. GREEN. No, \$47,301.

Q. Then where do you get your \$37,000? A. If I may follow that answer a little further—

Q. Oh, yes. A. In the other column I am endeavoring to compute the annual charges for operation by water.

Q. How much are those? A. That must include fixed charges and interest on a water plant at some value—

Q. Yes. A. Up to page 52 I have determined all the charges in that case for that column except water rent, fixed charges and interest on the water plant. Now I have added the water rent and I get \$40,850, which covers every charge for the operation of the combined plants, save only fixed charges and interest on the water plant part,—\$40,850. Now the figure of \$47,301, which I had in the other column, covers every charge for operation by steam. The difference—

Q. Why do you deduct to make the difference? Why do you get anything that is of any consequence in that \$6,000? A. I certainly do.

Q. Very likely you do; I want to know why. A. It is necessary to compare these two propositions on a similar basis. I must include an 8 per cent. interest charge on both in order to get their comparative value. I have gone ahead on page 54 and done something which may perhaps make that clear. I have gone to work now, having arrived at that value of \$54,500, and then, having considered that the fair market value of the steam and electric plants is \$95,000, I have gone to work now and computed the whole charges of operation by steam and water combined, including every charge of every nature, based on those two values, and I arrive at a total of \$46,780.

Mr. GREEN. If the other side do not object, I think I can make that item of \$6,000 clear in a few words.

The CHAIRMAN. I wish they would not object—

Mr. BROOKS. We do not object.

Mr. GREEN. If you will pardon me, Mr. Warner—

Mr. GOULDING. I object to the explanation of counsel. If his witness cannot conduct his examination and demonstrate his proposition without the aid of counsel, I think we ought to have the advantage of it.

Mr. GREEN. Well, pardon me, Mr. Warner—

The CHAIRMAN. I don't know whether you ought to take advantage of the fact that the Court cannot—

Mr. GOULDING. I have had a great many witnesses when, if I could have gotten up and explained to the court what they meant and what they failed to say, I should have gotten along better if the court had taken my statement.

Mr. GREEN. I do not think that Mr. Warner needs any apology, and I did not intend to offer it in that way. I thought I could save formulating a few questions and make the difficulty in your Honor's mind clear.

Mr. GOULDING. I make no reflection upon the witness at all; it is simply a matter of principle.

The CHAIRMAN. I guess it can be straightened out. It is four o'clock.

(Adjourned to Wednesday, Dec. 19, 1900, at 10 A.M.)

FORTY-NINTH HEARING.

BOSTON, Wednesday, Dec. 19, 1900.

The Commission met at the Court House at 10 A.M.

The CHAIRMAN. Mr. Green, in relation to the question asked by you yesterday, we think it is not competent and so we will exclude it. We do not mean by that to prevent your showing that any part of this property is unsuitable for business, but we do not think that the construction of that question is of such a character as to make it competent.

Mr. GREEN. Your Honors will save me on that, of course.

The CHAIRMAN. Yes.

Mr. MATTHEWS. Have your Honors considered the provision of the Public Statutes bearing on that, Chapter 170, Section 43?

The CHAIRMAN. No, I have not looked at it. What is it?

Mr. MATTHEWS. I would like to read it:

"Section 43. The jury in a case may, at the request of either party, be taken to view the premises or place in question,"—

That is the common rule, and I call your attention to what follows:

—"or any property, matter, or thing relating to the controversy between the parties, when it appears to the Court that such view is necessary to a just decision."

That language, it seems to us, is broad enough to include a case like this. I would like also to call your Honors' attention to two cases in the Massachusetts Reports. One is 174 Mass., 245. I have not the name of the case and I have not the correct reference to the other case; I looked these up in a great hurry. The language of the Court in the case in 174 Mass., 245, is, we think, significant as assimilating a view to photographs and such things, just as I yesterday assimilated a view to these plans which have

been prepared by Mr. Warner. But it seems to us that we need not go beyond the language of the Public Statute itself to invoke any authority on the question.

The CHAIRMAN. Perhaps it is broad enough, as far as that goes, but on the other hand—

Mr. GOULDING. On the other hand, it is not broad enough.

The CHAIRMAN. It may be a matter of discretion with us to do it or not. I should hesitate very much before I should do it.

Mr. MATTHEWS. I misunderstood your Honor; I thought this was a final decision.

The CHAIRMAN. No; I excluded that question in regard to suitability.

Mr. MATTHEWS. I thought what your Honor was talking about was the Woburn view. Perhaps this ought to come out of the record.

The CHAIRMAN. No, let it stand.

Mr. COTTER. Have you the second case in mind now?

Mr. MATTHEWS. No.

Mr. GOULDING. I suppose your Honors will put no construction on that statute until you hear us. It would be the very statute we should cite in support of our proposition.

The CHAIRMAN. Before we undertake to pass upon this question we will hear you.

Mr. MATTHEWS. I had something further to say on the subject, but I will postpone it. I was entirely in error as to what the Court meant. Will the Chairman kindly repeat what the ruling of the Commission was that I misapprehended?

The CHAIRMAN. We think that the construction of the question renders it incompetent. We haven't any doubt but what your experts may testify, if they so think, that any part or the whole of this property is unsuitable and not fit for business, but this question involves a thing which we do not think relates practically to that. Without going into any further discussion on it we will exclude it and save your rights.

Mr. MATTHEWS. Is this the question that was excluded: "Whether or not at an expenditure of \$72,000 for the land and privilege"—

The CHAIRMAN. The question was this: "Whether or not at an expenditure of \$72,000 for the land and privilege, and a

rental of \$24,000 a year for water power, this water plant is suitable to be used for the purpose of furnishing power to the electric light plant."

Mr. MATTHEWS. Suppose the question had been "suitable for the purpose of its use."

The CHAIRMAN. I do not think the beginning would pass. My idea of the statute, I may be wrong—I dislike very much to pass on a question that is as yet unsettled—but it is my impression, and I think brother Cotter's, that the phraseology of the statute did not relate to the financial suitability, but to the physical suitability.

Mr. MATTHEWS. The mechanical and physical suitability?

The CHAIRMAN. Yes.

Mr. MATTHEWS. All we want is to understand whether the Commissioners do rule that way, and if they do that settles that question so far as this case is concerned.

Mr. GOULDING. There is an objection that lies below that—I am afraid I shall precipitate another closing argument from my friends.

Mr. MATTHEWS. Which you feel so sensitive about. I never saw such sensitiveness about the citation of authorities or about arguments on undecided questions of law as is exhibited from day to day by our friends on the other side. We simply want to know where we stand.

The CHAIRMAN. Well, we want to help you.

Mr. MATTHEWS. We want to know whether we are right in assuming that the Commissioners rule as a matter of law that we cannot ask an expert witness whether this water power is suitable for the purpose of running a central lighting station.

The CHAIRMAN. On account—

Mr. MATTHEWS. On account of the expense?

The CHAIRMAN. On account of the expense.

Mr. MATTHEWS. If that is the rule of the Commission we desire to except and let it go.

Mr. GOULDING. I believe I will suggest that the true construction of the statute, as we contend, furnishes an additional reason—and I do that even at the risk of exposing myself to another concluding argument—which entirely settles the case mathematically. I want it distinctly understood that we claim that the

"suitable" in the statute refers to property outside the plant, and not the plant itself or any part of it.

Mr. MATTHEWS. I think that this discussion has been fruitful already.

The CHAIRMAN. If we exclude this, as we have, and for the reason that you state, nevertheless, running alongside of that is the fact that you are allowed to show by this witness, to demonstrate by his figures if they are correct, that this will be a losing proposition; and practically the witness already has so testified in the beginning of his examination.

Mr. MATTHEWS. I understand that we are not shut off by this ruling from showing what the value of this power is for the purpose of running an electric lighting station.

The CHAIRMAN. Or the effect of that value.

Mr. MATTHEWS. Or the effect of any given rent on the value of the plant, which is practically the same thing, I take it. That is, we can show by this or any other competent witness how much the water power is worth for the purpose of a central lighting station, but your Honors think we cannot ask a witness whether at some assumed price the water power is suitable for the purpose?

The CHAIRMAN. It is a queer meaning of the word. I do not see how you use that word in that relation. The water power may be suitable—

Mr. MATTHEWS. Mechanically.

The CHAIRMAN. May be suitable for the purpose, and yet you say you lose money, it is not a profitable thing.

Mr. GREEN. Does your Honor still bear in mind the peculiar form in which this property is tendered to us? Mr. Matthews called the attention of this Commission to it, and we asked some questions of the other side, and this particular point was not answered. This water power is not tendered in the language and in the form, in their offer, that the rest of the property is. I do not know whether that has occurred to you. There seemed to be a distinction in the mind of—I understand it was Judge Wells—or whoever it was that drew the offer. They followed the language of the statute in tendering to us the land, buildings and apparatus. Then when they came to the water power it seemed to us that they said, This is something which the Commission has no right to

award as a part of this general proposition, but if you want it at this figure you can have it at this figure. We asked if there was any distinction intended in that language, and we have received no reply. Now, it may be there was, and it may be there is. It seems to me that we have a right to deal with this first generally; and in the second place—your Honors have passed upon the first—I want to ask this question now:

Considered from a financial standpoint, whether or not at an expenditure of \$72,000 for land and privilege, and a rental of \$24,000 a year for water power, this water plant is suitable for the purpose of its use in furnishing power to the electric light plant?

The CHAIRMAN. We think that is practically the same thing, Mr. Green.

Mr. GREEN. Well, I wanted to be sure. I want to understand if your Honors exclude that form of the question.

The CHAIRMAN. Yes.

Mr. GREEN. And we want an exception saved to that.

The CHAIRMAN. Yes; all right.

Mr. GREEN. Now the question comes here in this way: Your Honors rule out the expression "suitable" as applied to the financial proposition that we have. We should like to know what is the standing of the Court in regard to this proposition of \$24,000 a year rental and \$72,000 bonus. Does that stand or fall as an entire proposition?

The CHAIRMAN. What do you mean, either \$24,000 or nothing?

Mr. GREEN. Yes, sir.

The CHAIRMAN. We cannot pass on that now.

Mr. GREEN. It seems to me that it is inevitably mixed with the question which the Court has passed upon.

The CHAIRMAN. Not at all. We simply say that you cannot ask your expert that question. We have excluded those questions and I do not see the need of discussing it. Certainly as to going into the question to show that you did not need any of it, or to show you needed a part of it, or to put any price on it you please, you use that property and treat it exactly the same, except with reference to this particular thing. We do not think that question is practically a logical question. The premises and conclusion of that question are wide apart, so that we do not think it is of any advantage to us.

Mr. GREEN. Then we are at liberty, if I understand the Commission right, to show what the annual value of this water power is for the purpose of supplying power to an electric light station.

The CHAIRMAN. Yes. You are already doing it by this witness, and you can do it by any witness you have a mind to. But this question which you put is a very narrow question; it does not affect the essentials of your case in any way, shape or manner.

ROBERT L. WARNER, *resumed.**Direct examination by Mr. GREEN, continued.*

Q. Mr. Warner, turn to your schedule T, I think it is.

The CHAIRMAN. Yes, Schedule T.

Q. Mr. Warner, in Schedule T, you are, as I understand, endeavoring to find out what can be paid for the water plant on certain assumptions? A. I am.

Q. And the first assumption is, as I understand it, that the water is measured and paid for at the rate of \$1,500 per mill power per annum?

The CHAIRMAN. That I understand. He goes on the assumption it must be measured.

Mr. GREEN. Yes, sir.

Q. Now, what is the test that you apply here in determining what can be paid for the water plant? A. The test is this: You cannot pay for the water plant a price which will oblige you to spend more annually running the whole plant than you would spend annually running the steam and electric plant alone.

Q. You cannot pay to run the whole plant by steam and water more than to run by steam alone? A. That is the proposition.

Q. That is, you base it, if I understand you right, upon the expense of running the plant. This is a test on the basis of expense? A. Including also interest.

Q. Well, interest is part of the expense as you have used it, is it not? A. It is.

Q. Tell me if this is a correct statement. The cost of the water plant must be such that the expense of running by combined water and steam plant must not exceed the cost of running by steam alone?

Mr. GOULDING. I object to the question as leading.

The CHAIRMAN. It is leading, but at the same time we want to get at the essential thing.

Mr. GOULDING. Then may I ask the Court if it wouldn't be a good thing for us to state our theories and call on the experts to answer if they do not think that our propositions that we make successively are correct? I think there are two or three

propositions in this case that I can state better than the experts can—only two or three.

The CHAIRMAN. I must confess that is leading. I should like very much to have the question put that way, but it is objected to.

Mr. GREEN. I had supposed the matter was entirely in the hands of the Commission. This witness has stated substantially that proposition in two or three forms, and I want to have it in concrete form.

The CHAIRMAN. State it again, since it is objected to. I would like to hear him state it himself.

Mr. GREEN. (To the stenographer.) Will you read the witness's last answer—his own statement?

The stenographer read as follows:

"A. The test is this: You cannot pay for the water plant a price which will oblige you to spend more annually running the whole plant than you would spend annually running the steam and electric plant alone."

Q. Well, now, to run the whole plant how? A. By steam and water.

Q. Will you state that again, using the words steam and water? A. The proposition is this: You cannot afford to pay more per annum for the operation by steam and water than you could operate for by steam alone.

Q. What are the divisions of expense of running? A. I consider them as under the headings labor, material, general expense, fixed charges, and, for comparison, interest.

Q. Fixed charges and interest are computed upon what? A. Fixed charges and interest are computed upon the price paid, or the value, the fair market value.

Q. Now you first have ascertained, as I see by your schedule submitted, and as stated on page 54, the cost to run by steam alone?

The CHAIRMAN. Does that include everything, that \$37,000?

Mr. GREEN. \$47,000. If your Honor will turn to page 54—

The CHAIRMAN. Oh, yes, \$47,000. That includes everything?

Mr. GREEN. Cost to run by steam alone.

The CHAIRMAN. Yes.

The WITNESS. That is the cost to run by steam alone, excluding the water plant.

Q. That amounts to \$47,301. That \$47,301 which is shown at the bottom of page 54 is shown in detail on page— A. 44.

Mr. GREEN. On page 44, if your Honor please.

The CHAIRMAN. Yes, I understand, I think.

Q. Including labor, material, general expense, fixed charges and interest. Now having found what it cost by steam alone, including every expense, what do you next endeavor to determine? A. I endeavor to determine what it will cost to run by steam and water combined.

Q. You endeavor to find what it will cost to run by steam and water alone, including what propositions—including what elements of expense? A. Including labor, material, general expense, fixed charges and interest.

Q. Fixed charges and interest on what? A. Fixed charges and interest on the whole water, steam and electric plant. I endeavor to find that.

Q. Before you get at that result, in order to get at that, what is your next step? A. I proceed as far as I can—I determine the labor, I determine the material, I determine the general expense. When I come to the question of fixed charges, that I cannot compute altogether because I do not know the value of the water plant.

Q. Exactly. That is the proposition you are trying to get at now? A. That is what I am trying to get at; but I can compute the fixed charges of the steam and electric part of it, because I know its value.

Q. Then you find the expense on running the steam, water and electric plants, and the fixed charges on the steam and electric plants? A. Correct.

The CHAIRMAN. That is to say you can run steam and water combined, as you think, \$6,000 cheaper than you can steam alone? Is that the idea?

Mr. GREEN. No, that is not the idea.

Q. Now, having found what you can run by steam and water for, taking in all labor, all expense, all material, and only the fixed

charges on the steam and electric plant and interest on the steam and electric plant, the total amounts to how much? A. Page 52, the total of labor, material, general expense, and fixed charges on the steam and electric plant is \$37,137.

Q. Then you add your water charge? A. I add the water charge.

Q. The total is \$40,850? A. The total is \$40,850, which includes all charges save fixed charges and interest on the water plant alone.

Q. Now, if you subtract that \$40,850 from the \$47,301, you get a remainder, as you show on page 53, of \$6,451. Now what does that represent? A. That remainder represents the maximum annual amount which may be devoted to fixed charges and interest on the water plant alone, without arriving at a total annual cost of operation of the combined plants greater than the cost of operation of the steam-electric plant alone.

Q. That is, \$6,451 is the maximum amount which can be devoted to fixed charges and interest? A. On the water plant.

Q. On the water plant. Now, fixed charges and interest are computed upon the cost of the plant, as you told us a moment ago?

Mr. BROOKS. Excuse me, he did not say cost; he said market value. I took it down.

Mr. GREEN. He said upon the price.

Mr. MATTHEWS. He used both terms.

The WITNESS. Both.

Mr. BROOKS. "Fixed charges and interest are to be computed on fair market value."

Mr. GREEN. He used the words "price paid" in one case.

Mr. BROOKS. Does he mean now that it is computed—do you mean now, Mr. Warner, that it is computed on the structural—

Mr. GREEN. Just a moment. I object to this interruption at this point. I am trying to follow this through.

Mr. BROOKS. All right; I will take it back; there is a time coming. I thought I would clear it up now.

The CHAIRMAN. Go on.

(The stenographer read the question, as follows:

"Q. Now, fixed charges and interest are computed upon the cost of the plant, as you told us a moment ago?")

Mr. BROOKS. I submit he did not say so a moment ago, and I object to the question.

Q. Whether or not that is correct, Mr. Warner? A. I consider that the plant should not cost more than its fair market value. I do not think it ought to cost more than its fair market value. The balancing value, the apparent structural value, may not be the fair market value; I do not think it is here. I think it is more than the fair market value. In computing finally the total operating expense, these charges must be based on fair market value, or on cost, which should be fair market value.

Q. You determined an amount which can be paid in fixed charges on the water plant. Now, in Schedule I, which is on page 35, you determined for us the fixed charge and interest rate for the water plant? A. I did.

Q. For the purpose of comparison. And that amounts to 11.86 per cent. And then having obtained the fixed charge and interest per cent. and having obtained the amount that can be paid for fixed charges and interest, what do you next do? A. I have determined the maximum amount which can be paid for fixed charges and interest, and I capitalized that amount at the fixed charge and interest rate.

Q. Which is 11.86 per cent.? A. Which is 11.86 per cent.

The CHAIRMAN. Why do you capitalize it at that rate?

Mr. GREEN. Just a moment; if you will let me follow this.

Q. Now, suppose we put this in the form of an equation; you have \$6,451 equals what? A. It equals the fixed charges and interest on a water plant costing \$54,500.

Q. Is it the amount that can be paid for fixed charges and interest, the maximum amount? A. On the water plant.

Q. Now, what else have you which also represents the amount that can be paid for fixed charges and interest? Whether or not 11.86 per cent. represents that? A. I do not quite understand that question. The \$6,451 is the only amount I have determined.

Q. That is an amount— A. Yes.

Q. —that represents the money that can be paid for fixed charges and interest, the maximum amount? A. The ratio which that amount of money bears to the value is 11.86 per cent.

Q. \$6,451 represents the maximum amount of money that can be paid for fixed charges and interest, as I understand?

Mr. GOULDING. Is that shown on some page?

The WITNESS. 53.

Q. That is right, is it? A. That is correct.

Q. Whether or not 11.86 per cent. also, in Schedule I, represents the fixed charges and interest? A. It represents the fixed charge and interest rate.

Q. On the water plant? A. On the water plant.

Q. Then does not \$6,451 equal 11.86 per cent.— A. Of the—

Q. 11.86 per cent.? A. Yes, sir.

Q. Then having that equation, $\$6,451 = 11.86$ per cent., that amounts to capitalizing \$6,451, does it not—the same thing? A. It appears to be correct.

Q. Now put it the other way. Without working it out in the form of an equation, will you explain to the Commission from another standpoint why you would capitalize \$6,451, which is the amount you can pay at a maximum for fixed charges and interest at the rate of 11.86 per cent.? A. I do that as the most direct method of arriving at the apparent value of the water plant. I might have gone ahead with my full table of estimates of the operating expenses of the combined plants, assuming a value for the water plant; I might have said, "We have gotten down, now, to fixed charges and interest on water plant; suppose it is worth \$100,000 and let us see how we get out. I find that we will lose money. I say, suppose it is worth \$5,000, make another try and find that in that case the operation by water would be lower than by steam. I make another try and say perhaps \$50,000 or \$60,000. By such a cut-and-try method, I would finally arrive at the fact that \$54,500 was the price at which we could take the water plant, pay interest and fixed charges on it, and come within the cost of steam operation.

The CHAIRMAN. I think I understand your theory now.

Q. Now we will pass to page 54. You have now inserted a value of \$50,000 for the water plant, or a total of \$145,000 for the two plants? A. I have.

Q. And you have now computed what it would cost us to operate on that basis? A. I have.

Q. Now, the labor is the same as before, the material and the general expense, is it not? A. They are the same as employed in Schedule T.

Q. Yes. You have filled in here the missing items of fixed charges and interest on the water plant, have you not? A. I have, taking it at fair market value.

A. At \$50,000? A. \$50,000.

Q. The total amounts to \$46,780, which is somewhat less than the cost to operate by steam alone. Let me ask you this: if instead of using the figure \$50,000 as the value of the water plant, you had used \$54,500, the exact sum that you had obtained by capitalizing at 11.86 per cent., would the total have differed at all from the \$47,301, which represents the expense of running by steam alone? A. It would not.

Mr. GREEN. Have we made that clear?

The CHAIRMAN. I understand it now, I think.

Mr. GREEN. I desire to offer in evidence in connection with—before I offer this—

Q. Mr. Warner, turning to your plans which are here present on these boards, whether or not the two plans, one marked "Cross-Section" and the other "Plan Arrangement," represent in your mind a good engineering construction of an electric light plant in January, 1898? A. They do.

Q. And are they drawn to a scale? A. I believe they are not. I see no scale marked. Those plans were drawn under my general directions as the result of rough pencil sketches which I made for the draughtsman to go ahead on, and I gave him the sizes of the units and the space I wanted for the switchboard, the office space I wanted, and the space required for the boilers and coal and so on, and he drew those plans and delivered them to me.

The CHAIRMAN. Mr. Green, I do not imagine there is any difficulty about these. They are already in the schedule. You don't object to their going in, do you, Mr. Goulding, these chalks?

Mr. GOULDING. No, except under our general objection.

The CHAIRMAN. Very well.

The WITNESS. There is one point I especially want to call attention to.

Q. If there is anything you want to call attention to, I wish you would do so. A. I want to call attention to the fact that I consider the ground dimensions should not be exactly as shown on that plan. I consider the general arrangement of the cross-

section in the general plan is correct. I would widen the building somewhat to afford facility for extension without throwing out the wall. I have done that and estimated on a building of slightly different outside dimensions from that. I explain that so that that question will not arise.

Q. I wish you would, for I was not aware of it. A. This plan represents correctly a cross-section and correctly a general ground arrangement, but my estimates of cost are based, in the case of the 725 kilowatt plant, on a larger building—wider; I will give you those dimensions right here, so that they will be on record.

By Mr. MATTHEWS.

Q. In the estimate of the cost of the 575 kilowatt plant have you used these plans? A. I have followed these plans, but not exactly as to outside dimensions.

By Mr. GREEN.

Q. Will you give us the outside dimensions of the plan you have figured upon? A. I should erect a power station for the 575 kilowatt plant approximately 112 feet long by 93 feet wide. The dimensions here for comparison, as shown by those illustrations, happen to be 118 feet 4 inches long by 85 feet, 8 inches wide. I should make the station a little shorter and a little wider than shown by the dimensions on that diagram.

By Mr. GOULDING.

Q. Do I understand there would be a change in the estimate of expense? A. I have based my estimate on these dimensions which I have used. I submit these diagrams as illustrating the general character of the plant and the general arrangement of the plant.

By Mr. GREEN.

Q. Your schedule for a new plant is on what page?

Mr. BROOKS. Mr. Green, may I ask this—

Mr. GREEN. Certainly.

By Mr. BROOKS.

Q. Is the lay-out of your station to be the same as it is in this present— A. Substantially the same.

By Mr. GREEN.

Q. You would make the buildings somewhat larger? A. Somewhat different.

Q. In estimating upon the cost of the new plant, whether or not you have used these enlarged sizes? A. I have used—it is hard to call them “enlarged,” because it is shorter, but it is wider. I have used the sizes I have named, that is to say, 112 feet long by 93 feet wide in making my estimates.

Q. What is the page of your new plant? A. 30.

Q. Whether or not, in your opinion, you could construct this new plant for the sum you name here? A. I could have done so in 1898, January, and the succeeding months.

Q. You say you did? A. I could have done so.

Q. You could have done so in January, 1898, and the succeeding months? A. Yes.

Q. I forgot to ask you one question, which may come in here: Mr. Warner, in a general way, what experience have you had with the financial operations of electric light stations—of electric companies? A. I have not personally been identified as an officer, as an active officer, with any electric lighting company. I have testified already to some questions relating to my experience as a director in companies which are at present engaged in developing railway and lighting and power business. In my ordinary business from year to year I associate with men who are engaged in the financial management of such companies. I am familiar with their methods, or many of them. I have a great deal of confidential information bearing on their costs, their costs of operation, their methods of management, and their practice in those matters.

Q. Have you any information as to what it would cost per foot to erect a station of the style and plan of the station that you have outlined here? A. I have.

Q. What do you say would be the cost per foot?

Mr. BROOKS. We object to that.

Mr. GREEN. Well, I will strike that out.

Q. How have you estimated the cost of the building as set out in Schedule D on page 30? A. I have taken the ground area of the building, including the stack, as the total of 112 feet long by 93 feet wide, a building substantially of this general shape (indi-

cating). I have estimated that that building and stack with foundations could be put in place for a contract sum of \$3 per square foot of ground plan in January, 1898.

Q. Did you have any knowledge or information in regard to the construction of buildings of that type, which—

Mr. BROOKS. We object to that.

The CHAIRMAN. He asks if he had any knowledge.

Mr. BROOKS. He says, "knowledge or information."

The CHAIRMAN. Information? You need not ask him to give that.

Q. Do you have any knowledge of your own in regard to the cost of buildings of this type on the basis of a square foot? A. I have.

Q. And you used that knowledge? A. I used it.

Mr. GREEN. I want to ask a few questions as a basis for the Commission's dealing with the question of the view which we have asked—

The CHAIRMAN. We will take for granted your statement, that is, that you have got a station out there that is somewhat comparative, that is, that it will show these things which you claim. We will take your statement of that, and Mr. Matthews'.

Mr. GREEN. Then the Commission accept the fact that in dealing with this—this I think should go into the record—that this Woburn plant was built, as we understand, in 1898, to supply a population similar to the one in Holyoke, that is, so far as the demand, or consumption, is concerned, and of about the same capacity.

Mr. BROOKS. Do you mean the street lighting?

Mr. GREEN. I understand so.

Mr. GOULDING. We object to the whole evidence, it having no relation to the case before us. That is our position about it.

The CHAIRMAN. We understand it.

Mr. GREEN. And also it is a type of what we call a modern commercial plant.

The CHAIRMAN. The statement which you made yesterday covers it all.

Mr. GREEN. Yes, but I had not covered the time as to when it was built.

The CHAIRMAN. We will go on the assumption that you have offered that as evidence.

Q. Mr. Warner, have you prepared some estimates for us dealing with the value of the condensing water offered by the company to us in their later proposition, and also the value of the water for the extra days on which it is supposed we shall have it under the new proposition? A. I have, yes, sir.

Q. Have you inserted those figures in the— A. I have made no schedules.

Q. Have you a schedule with you? A. I have not. I have some pencil notes and some typewritten notes and some miscellaneous matter bearing on that, but I have no schedule.

The CHAIRMAN. He has put a value in here somewhere, Mr. Green, as I saw yesterday.

Mr. GOULDING. I am not aware that he has put anything in. If he has, we object to his competency to testify upon any such subject.

The CHAIRMAN. I saw somewhere yesterday some computations made on condensing water.

Mr. GREEN. I think that is involved in the comparison of the present new plant. It is running the plants, I think your Honor will find, however, under the original proposition.

The WITNESS. I believe there are no figures in these schedules I submit bearing on the question of condensing.

The CHAIRMAN. Very well. I did not understand the question probably.

Mr. GREEN. This applies to the new proposition, and to find out what additional value there may be in their offer as based upon that.

Q. Will you tell us, Mr. Warner, what in your opinion is the value of the condensing water offered us under the new proposition of the company?

Mr. GOULDING. We object on the ground that he has not qualified for that.

The CHAIRMAN. How do you qualify him for that, Mr. Green?

Mr. GREEN. We think he has qualified himself already. It is a question of steam power.

The CHAIRMAN. This is a question of the valuation of water.

Mr. GREEN. I know, but it is a question of what added value it gives to the steam plant.

The CHAIRMAN. Very true, but you have got to have a man qualified in order to testify to help us. Water for condensing purposes has different values in different localities.

Mr. GREEN. Cannot any steam engineer testify what additional value it is to his plant to have condensing water?

The CHAIRMAN. What do you mean by condensing water—water itself, or the fact that it has or hasn't it? It has got to have it, of course, has it not?

Mr. GREEN. What additional value it will give to this plant if it has water supplied for condensing purposes. It is not a question of water power; it is a question of the value of this plant, in one case if we run without water for condensing purposes, and in the other, if we have water for condensing purposes on certain days.

Mr. GOULDING. It is a pure question of the value of water at this point. It must be, and to be used for this purpose. I submit that he has shown no qualifications for testifying on that subject. An electrical engineer may absorb a good deal by way of induction or association with electrical people, but I submit there is no method by which you can qualify him with respect to water in Holyoke.

Mr. GREEN. The water is offered distinctly for condensing purposes to us, and it is offered distinctly for condensing purposes to be used in connection with this particular plant and no other plant. Therefore, the proposition plainly before us is, what additional value, if any, does it give to this plant. Now, I say that any steam engineer can pass upon that question.

The CHAIRMAN. I say that any steam engineer cannot pass upon that question.

Mr. GREEN. That is quite a point-blank ruling from the Court, but I cannot see who can pass upon it if a steam engineer cannot.

The CHAIRMAN. Of course a steam engineer can if he knows the locality, but the value is different in different localities. What does this man know about the value up in Holyoke any more than I do?

Mr. GREEN. This man knows what it will cost to run this

plant without water for condensing purposes, and this man knows what additional value the use of that water will give to this plant.

The CHAIRMAN. You have got to have the water in order to run the thing, haven't you?

Mr. MATTHEWS. It is not run that way now, your Honor.

Mr. GREEN. It is not run that way now. It is not run condensing now.

Mr. MATTHEWS. The engines are run non-condensing.

Mr. GREEN. He has given a value on this plant run as it is now. The question is, how much additional value is given to it if they have water for condensing purposes.

The CHAIRMAN. What does that instruct you upon, the engines?

Mr. GREEN. Certainly; it is entirely a question of steam power.

The CHAIRMAN. Mr. Turner, what do you say about it? You know more about it than I do probably. You pass upon this question. (The Commission consulted.) Mr. Turner says we should admit it. (To the witness.) Answer the question.

The WITNESS. I would like to have it read.

(The question, "Will you tell us, Mr. Warner, what in your opinion is the value of the condensing water offered us under the new proposition of the company?" was read by the stenographer.)

Mr. GREEN. Strike that out.

Q. Will you tell us what additional value in your opinion is given to the steam and electric plants if water is furnished condensing in accordance with the company's later offer?

Mr. GOULDING. Is that the proposition that the Court ruled in?

The CHAIRMAN. What we are ruling in is this, if there is any value—any change in value by this offer, he would like to know what it is worth, and Mr. Turner, who knows about this matter practically, of course, thinks this witness can testify about it—do you not, Mr. Turner?

Mr. TURNER. Yes.

The CHAIRMAN. I understood the question first put related purely to the value of the water.

Mr. GREEN. The question might have been inaccurately put, but it amounts to the same thing taken in connection with the general subject; but there is no exception to the later proposition, I understand.

The CHAIRMAN. Answer the question, Mr. Witness.

The WITNESS. (To the stenographer.) Will you read that question?

. (The question "Will you tell us what additional value in your opinion is given to the steam and electric plants if water is furnished condensing in accordance with the company's later offer?" was read by the stenographer.)

A. Considering the steam and electric plant alone, water plant excluded—

Q. Yes. A. Steam and electric plant run by steam 365 days a year. As I understand the modified proposition, it involved the furnishing of water for condensing when there was water in the canal.

The CHAIRMAN. He has asked you only to give an answer to his question.

The WITNESS. I am endeavoring to make myself clear.

The CHAIRMAN. Cannot you answer it in dollars and cents?

The WITNESS. It is quite impossible to answer it in dollars and cents without some explanation.

Q. If you will answer it directly first, then I will give you an opportunity to explain. A. (To the stenographer.) Will you give me that question again?

(The question was again read.)

Mr. BROOKS. Now, we object to this, may it please your Honors, in view of what his introductory remarks were, from this fact: As your Honors recall, we give them the condensing water only upon the presumption and agreement that they shall take the water power according to that proposition. So how can this have any competency upon the question of the steam plant?

The CHAIRMAN. Without discussing it, gentlemen, let us take the answer, and if it is not competent we will exclude it later.

Mr. GREEN. The witness will give his full explanation of this and the following proposition, and after we get through, if it is not competent it can be dealt with, it seems to me.

Mr. MATTHEWS. If your Honor will pardon me, Mr. Brooks has suggested a totally new idea to us. Do you mean that we will not get water for condensing anyway unless we take the water plant and power?

Mr. BROOKS. Unless you take a water plant and power.

Mr. MATTHEWS. And unless we take it at the price you name, \$72,000, and \$24,000 rental?

Mr. BROOKS. I did not say that.

Mr. MATTHEWS. What you mean is that we must take this water plant and some water power at some price in order to get the benefit of this condensing privilege?

Mr. BROOKS. I so—

Mr. GOULDING. What Mr. Brooks means, I understand, is Exhibit 119.

Mr. MATTHEWS. I am asking what he does mean. I do not know as I understand it now.

Mr. GOULDING. We haven't anything except this.

Mr. BROOKS. Certainly that is all that is contained in what has been called here the "supplemental offer" by somebody. I do not think it is any new proposition, Mr. Matthews. I thought it was thoroughly understood.

Mr. MATTHEWS. I thought you meant something different when you spoke.

Mr. BROOKS. No.

The CHAIRMAN. Have you given the answer, Mr. Witness?

The WITNESS. Well, I am not quite clear as to what I am asked to answer. I can give an answer "straight out" on one of two propositions. As I understand the question, it is obscure; I am not clear as to whether you want me to say whether the water for condensing has a value, and if so, what, for operation 365 days by steam, or whether you want me to say if it has a value or not during the operation on restricted days.

Q. I wanted both. I wanted the first one first, that is, the value for operation 365 days. What additional value would there be to this plant if there was water for condensing purposes for 365 days?

Mr. BROOKS. That is, the value to the steam plant?

Mr. GREEN. Yes; what additional value.

Mr. BROOKS. I say it is entirely incompetent. I claim it is entirely incompetent.

The CHAIRMAN. We understand. We will take the testimony, and then examine it, and pass upon it later.

Mr. BROOKS. Pass upon it later? Very well; I am content then.

The CHAIRMAN. I think the quickest way to get this answer is to let the witness answer it in his own way.

A. I can give you a direct answer to that question.

The CHAIRMAN. All right.

The WITNESS. Considering water furnished for condensing, steam operation 365 days, water furnished for condensing without rental, simply considered as appurtenant to the plant, that would enhance the value of the plant \$7,500.

Q. If furnished 365 days in the year? A. Yes.

Mr. BROOKS. You don't mind my suggesting—that is, you would add that to your table T of the steam and electric plant?

The WITNESS. Table T?

The CHAIRMAN. That is the last table.

The WITNESS. Well, I want to be sure.

Mr. BROOKS. Perhaps I am wrong about that.

Mr. GREEN. Schedule T includes the water plant.

Mr. BROOKS. Is it Schedule O?

The WITNESS. Schedule O, page 44, fair market value of the steam and electric plant, \$95,000. To that I would add \$7,500.

Mr. BROOKS. Yes; I see.

Q. If water was furnished for 365 days, I understand. Now, Mr. Warner, will you state how you arrived at that result?

Mr. COTTER. What was that amount, Mr. Green?

Mr. GREEN. \$7,500, as the additional value on that proposition.

A. I consider that we cannot afford to pay annually for condensing water in the form of interest upon this increased investment of \$7,500—we cannot afford to increase our charges on that account more than our charges would be increased by the use of a cooling tower for condensing instead of the use of water from the canal.

Q. Now, how do you get at the cost of condensing by the use of a cooling tower? A. In order to operate the plant condensing at all, in either case there must first be installed condensers,

pipied up to the engines properly. If a cooling tower be used, we must put additional money into the cooling tower and its appurtenances. We must pay a little more for somewhat larger condensers. In other words, we must increase our investment by using a cooling tower \$4,000.

By Mr. BROOKS.

Q. Do I understand that the cooling tower would cost that?
A. The cooling tower and the appurtenances require the extra expense due to getting it in.

Q. That includes the condensers? A. That includes the increase in the size of the condensers. You have got to have the condensers anyway in order to use the water from the canal. Now, they must be a little larger for use with the cooling tower, and that I have charged against the cooling tower, that expense.

Q. If there is no objection, I would like to ask you, how many horse-power? A. That is not clear; I cannot answer that question until you tell me what you mean.

Q. For how many horse-power do you condense? A. I have figured on a cooling tower to take care of 10,000 pounds of steam condensed per hour.

Q. What would that be in horse-power? If you don't care to answer it, all right. A. I will answer it if you will give me time.

Q. I had no business, perhaps, to have broken in. A. I am perfectly willing to answer it, but I have got to do it right. The amount of horse-power which that amounts to depends upon the character of the load and the efficiency of the engines and a lot of other things. It might be 600 horse-power; it might be a 600 horse-power engine; it might be a 450 horse-power load on the cylinders of the engine; it might be less. It is conceivable that it might be less.

Q. What I meant to convey was, what horse power do you provide for in your estimates?

Mr. GREEN. Which estimate? Do you mean this one he is now making, \$4,000?

Mr. BROOKS. Yes.

A. Well, I provide for condensing 10,000 pounds of water—of steam—per hour. That represented in my mind the probable maximum amount of steam which would have to be condensed during any one hour under present conditions of load.

By Mr. GREEN.

Q. You mean the present maximum? A. The present maximum during any one hour.

Q. What kind of engines does that assume? A. It assumes the engines that are right there.

Q. The present maximum load is somewhere from 450 to 500 horse-power, is it not? You have it, I think. A. The present maximum load is something over 500 horse-power, as nearly as I can tell.

Q. Now, Mr. Warner, returning to this same subject again, what is the size of the cooling tower that you have constructed in this estimate? A. The dimensions, you mean? The physical dimensions?

Q. Yes. A. I considered a cooling tower approximately 31 feet high and 12 feet in diameter.

Q. And the cooling tower set up, and including the well, you estimate as costing how much? A. A total of \$4,000.

Q. Well, do you understand my question aright? Leaving out the increased size of condensers, and leaving out piping and contingencies, taking the cooling tower alone, 12 feet in diameter by 31 feet high, set up, simply including the well.

Mr. BROOKS. You mean without fans?

Mr. GREEN. I mean just as I say, leaving out the increased condensers and leaving out piping and other contingencies.

A. The cooling tower, with well, with fan, with an engine to drive the fan, if an engine be used—a small engine—could be installed complete for \$3,000, not including the increase in size of condensers and not including piping and contingencies—additional piping and contingencies.

Q. You allow for the increase in size of condensers how much? A. \$500.

Q. And for piping and contingencies over and above piping necessary for condensers with canal water, how much? A. \$500.

Q. Making a total of \$4,000? A. Yes.

Q. Now, having ascertained what in your opinion it would cost to establish a cooling tower, and included in that the figure for the increase in size of condensers and the cost of piping and other contingencies mentioned, how do you proceed to use that result? A. I say that the annual charges due to the installation

and use of that cooling tower would be depreciation, maintenance, taxes, totalling 7 per cent. I further say that for comparison we must charge that investment with 8 per cent. interest, making a total of charges against that investment in the cooling tower of 15 per cent., which is \$600 per annum. In other words, it costs us \$600 per annum for comparison to use the cooling tower instead of using water from the canal for condensing. That answers the question.

Q. Now, having obtained \$600 per annum as the amount that it would cost to use the cooling tower, and using 8 per cent. as the interest charge, in getting at that 15 per cent., tell us how you proceed from that to get at the increased value. A. I consider that it is proper in determining the value of the condensing water appurtenant, of the rental, to capitalize that \$600 at 8 per cent. That is to say, capitalizing at 8 per cent. the \$600 gives us a value of \$7,500. That is the money you can invest in the right forever to use condensing water from the canal.

Q. That is, 8 per cent. of \$7,500 would amount to \$600, and the cooling tower cost \$600; in both cases you use the same interest rate of 8 per cent.? A. I do.

Q. That is, you charge up as against the cooling tower 8 per cent. of what it costs to establish it over and above an ordinary condensing plant, and you use 8 per cent. on \$7,500, and either way you get the same annual expense? A. I do.

Q. \$600 is the annual charge against the cooling tower? A. I ought to correct a slight mis-statement I made in answering one question that occurs to me. I said the value of water for condensing 365 days. I believe that that canal is dry some days, and that I have taken into account in this general way: Assuming that the canal were dry for from five to ten days per annum—I have no means of knowing how many days it would be dry—assuming it would be dry from five to ten days per annum, and no condensing water furnished—it might be dry more days—I say that fact counterbalances any difference in the method of condensing, if there be any. It is a disputed question among engineers as to whether condensing by means of a cooling tower is fully as efficient as condensing with a plentiful supply of cold water. Some engineers maintain it is more efficient under good conditions. I have used that fact, as I say, in a general way, as a factor of safety, and I consider that my conclusion is fair.

Q. I do not know that you stated in detail the amount that you allowed for depreciation on the cooling tower, for maintenance and for taxes. You may have. A. I said the total was 7 per cent. The items are, depreciation .5 per cent., I think—

Q. Is that .5 per cent.? A. I mean 5 per cent. Depreciation 5 per cent., maintenance .5 per cent., taxes 1.5 per cent., total 7 per cent.

Q. And the interest 8 per cent. added, makes the 15 per cent.? A. 15.

Q. Now, will you tell us what in your opinion is the additional value of this steam and electric plant, supposing that the steam plant is operated only during 45 days restriction and one half Sunday, that is, during the daylight Sunday? A. I must answer that with a slight modification of the question, in this particular—

Mr. GOULDING. I don't know about his right to.

Q. Will you tell me what— A. I have computed whether there would be a saving or not by steam operation, condensing, during 45 days restriction and one half of Sunday daylight, on the assumption that one half of the Sundays during the daylight there would be no water in the canal for condensing.

Q. With that assumption, will you state? A. And with that assumption I find it will not pay to make the investment in condensers at all. That is to say, that for those times the saving effected by the use of condensing water would not be sufficient to pay the fixed charges upon the investment necessary to use it.

Mr. BROOKS. Can we ask you a question? That is allowing for 71 one half days when you cannot have water?

Mr. GREEN. Yes, substantially that. Half Sundays would be 26; 45 would be 71, wouldn't it, Mr. Warner? I understand it that way.

The WITNESS. The exact way it is is this—

Mr. BROOKS. It would be really 80 days.

The WITNESS. The plant will have to be run by—

Mr. BROOKS. What I am after is to find out how many days he allows for.

The WITNESS. I want to give it to you correctly. I can give it to you within two or three days. I want to give it to you correctly. (Computing.)

Q. Have you got it? A. I am trying to be clear on this.

thing. I believe that if you operate by steam during 45 days' restrictions, and during the Sundays and holidays which fall within those restrictions, and during one half the Sunday daylight, assuming that during the other half of the Sunday daylight in the year the canal is dry for repairs—I believe that under those conditions the saving in operation of condensing would not be sufficient to pay fixed charges on the investment in condensers.

Q. The question asked you was this, Mr. Warner— A. I think I have wandered from it, but unintentionally. Now to return to Mr. Brooks's question, I believe it was, How many days' steam operation do you figure on? Am I correct?

By Mr. BROOKS.

Q. You can put it that way, yes; or, what do you consider the number of days when there will be no water for condensing? That was the thing I had in mind. A. Well, that is a different question altogether.

Q. Well, you have already spoken of 45 days and a half of the Sundays, as I understand it. A. Well, this is complicated by the fact that we would run by steam some days when there would be water available for condensing, and we would run by steam some days when the canal is dry and there is no water for condensing. Now, I have not at my command enough data concerning the dryness or wetness of those canals to be able to, say definitely how many days you would have to run by steam non-condensing. I have not been able to get that data from anybody, and I have assumed that we would have to run by steam non-condensing, owing to the dryness of the canals, only during such times as the canals are dry for repairs to wheels; and I have assumed that the canals would be dry for repairs to wheels an average per annum of one half the Sundays daylight in the year; or, in other words, that one half of the Sundays in the year during daylight the canal would be dry.

Q. That is, that there would be no water for condensing? A. No water for condensing.

Q. I do not now see the application of this. I do not get it through me—I don't know but the rest of you do. A. I will be glad to answer any questions.

Mr. BROOKS. I understand. In all probability it is very

clear to you. What do you say, Mr. Matthews? Do you understand this?

Mr. MATTHEWS. I do not think I understood your question fully to start with.

Mr. BROOKS. Then probably it is my fault.

Mr. MATTHEWS. I do not fully comprehend the answer.

Mr. GREEN. Let me ask some questions myself, now, please.

By Mr. GREEN.

Q. Under this statement which you have just made, you speak first of 45 days restrictions. What does that include? A. That includes the days when the users of non-permanent water would be restricted.

Q. Does that include holidays, I mean? A. I assumed that during this dry time in the summer when the non-permanent users are restricted, that any Sundays or holidays which fell within that time might also be called restricted days over and above this number, particularly if the water in the river were drawn down to a point where they could save it without throwing it over the dam. That is, if it were drawn down considerably below the dam, so that by restricting Sundays and holidays during restricted periods they would save water for their users who pay for it, that it would be so saved.

Q. Then your one half of Sunday daylight does not mean one half of Sundays, but it would mean practically a quarter of the Sunday hours? A. Substantially that.

Q. That is, during one half of the daylight of Sundays you have considered that there might be no water in the canal to be used for condensing purposes? A. For any purpose.

Q. Or any purpose, so far as that is concerned.

The CHAIRMAN. You are not running your electric plant during that time, are you?

Mr. GREEN. I don't know. We are not at the present moment, no. That is, the plant is not at the present moment being run that way. It is a question whether it ought not to be. We claim—we may introduce some evidence that a well regulated and well conducted plant ought to be so run.

The CHAIRMAN. All right.

Mr. BROOKS. Well, then you get more earnings.

Mr. GREEN. I don't know whether we do or not.

Mr. BROOKS. I don't know whether you would or not; still you probably would not do it unless you could make something.

Mr. GREEN. We probably should not want to pay it all out for power if we did.

Q. With that estimate, Mr. Warner, will you tell us what you considered to be the cost of condensers, foundations, pipes, etc., to run the plant condensing by water without the use of a cooling tower? A. \$3,500.

Q. And you figure the fixed charges on that at 15 per cent., same as before? A. I do.

Q. That would make an annual expense, on the basis of spending \$3,500 for condensers and foundation pipe, of \$525? A. It would.

Q. Now, what will you save if you run condensing? A. If you run condensing you might save as much as 20 per cent. of the coal bill, and I have assumed that you would.

Q. That would amount to how much, in your opinion, dollars and cents? A. I have computed that there would be required for the operation of the plant by steam non-condensing under this new proposition \$1,076 worth of coal per annum. I believe we may count on saving 20 per cent. of that coal bill by operating condensing. That saving amounts to \$215 per annum.

Q. That is less than the fixed charges on the additional investment by \$310, is it not? A. It is, a loss of \$310.

Q. On the assumption that the modified proposal of the company gives water to the plant on Sundays and holidays, whether or not you would make any additions to the value of your plant as previously stated? If so, what? A. I would. I believe the furnishing of water without charge Sundays and holidays, except such Sundays and holidays as fell within restricted periods, and excepting an average of one half the daylight Sundays, during which time the canals are dry for repairs, would effect a saving in coal alone, or substantially alone; that that saving in coal would amount to \$1,125 per annum. This is the only appreciable saving which would be effected. The saving in oil, waste, etc., would be inappreciable. This saving may be applied to interest and fixed charges in an increased investment in the water plant, the amount of which is determined by capitalizing the saving at the interest and fixed charge rate of 11.86 per cent. That is

\$9,500. To cover that, then, briefly, the furnishing of water without charge during the times named enhances the value of the water plant \$9,500.

Q. You have assumed that the water which is received on Sundays and holidays comes free, unpaid for? A. That is what I have assumed.

Q. Have you calculated it on the basis that the city receives the water but pays for it at measured rates? A. I have not.

Q. Mr. Warner, this last estimate that you have furnished us is based upon the supposition that we paid nothing for water. I understand that we may not be able to assume that, and I wish that you would, not now, but perhaps this evening, consider the last proposition in this form; you are dealing with it under your Schedule T, which is the measured water schedule; consider whether it would add anything to the value of the combined plants, water, steam and electric, in your opinion, if water was furnished Sundays and holidays, but paid for measured, as paid for on other days; that we received measured water.

Have you with you the details of the various figures which are furnished in your schedule? A. The details of all these schedules, you mean, that have been put in?

Q. Yes. A. I think I have.

Q. Just one final figure; I don't know whether it is stated somewhere or not. As I understand, your value for the steam and electric plant is \$95,000, and for the water plant, on the basis of measured water as set out in Schedule T, \$50,000? A. That is correct.

Q. The value of the combined plants on the measured water basis, as expounded in Schedule T, is \$145,000? A. That is correct.

Q. You were asked at one point, when you were explaining your theory of depreciation, if you took your 2 1-2 per cent., which was the per cent. used in connection with depreciation of the water plant, at simple interest, and you answered as follows: "You might put it that way. That is rather a departure, I think, from the idea I had in mind." Did you compute any interest on that 2 1-2 per cent at all? A. I have not done so.

Q. Will you tell us why you do not compute interest, either simple or compound, on the percentage which you set aside for

depreciation? A. Because that amount set aside for depreciation is merely reserved from the earnings to cover impairment of capital due to depreciation. That amount is set aside or taken out or held, and put into extensions to restore the capital investment. If you invest \$100,000 in a property, and it depreciates in a year 2 1-2 per cent., the net remaining value in sight is \$97,500. You must set aside in some way from your earnings for that year the difference of \$2,500, and either invest it in extensions to restore the capital investment and maintain it intact, or invest it in renewals of sections of the plant and restore the capital investment to its original value, and prevent impairment of capital. The only way in which interest could arise on that sum would be in the form of dividends. That involves a question I have not considered at all.

Mr. GREEN. That is all that occurs to me at this moment.

Cross-examination by Mr. BROOKS.

Q. Mr. Warner, as I understand you, you place your theory of valuation upon this water power entirely divorced from the business actually done by the concern that uses the water power for the production of electricity; am I correct? A. If I understand your question correctly, I would answer it in this way—

Q. If you could give me a direct answer I wish you would, and then explain. A. I will give you the most direct answer—

Q. And if you cannot, you cannot, I suppose. A. I have not taken earnings into account.

Q. Then it amounts to the same thing, doesn't it? You have considered your valuation of water power divorced from any business that that water power produces? A. Not exactly.

Q. Well, you have considered the value of water power entirely by comparing it with steam, haven't you? A. That is substantially correct.

Q. Now, coming back to the other question again, if you have a plant that is run by water power, producing a gross income of \$100,000 a year, and a net income of \$40,000 or \$50,000 a year, and the cost of producing by water is \$10,000 a year, if you should find that the cost of producing by steam was \$8,000 a year, you would call the water power valueless, wouldn't you, on your theory? A. That—

Q. Now answer my question yes or no. A. I am quite unable to answer that question without computation.

Q. Well, let us see. If your business is \$100,000 that the water power produces, a net income of \$40,000, you produce that gross income of \$100,000 and net income of \$40,000 by water power, which costs you \$10,000 a year, and if you could produce that same income by steam at \$8,000 a year, you would say, wouldn't you, on the theories that you have advanced here, that the water power was valueless? A. I am hardly able to follow your reasoning fully enough to give you a definite yes or no answer to it. You have given me assumed figures which involve earnings, a question I have not considered at all.

Q. Doesn't it come to this, then: That if you consider earnings in connection with the water power which produces those earnings, it would make your water power valuation higher? A. Not necessarily so, because—

Q. I am not asking you for the cause. You say it would not? A. Please read that question.

(The preceding question was read by the stenographer.)

A. It does not come to that.

Q. But in your considerations whereby you give us your opinion of the value of water, you have not taken into consideration the business produced by the water? A. Only to the extent that the fact that the plant as a whole produces business shows that it is capable of operation and may have a structural value.

Q. Then you do not take into consideration, in obtaining your valuation of water power, the extent of the business produced by that power? A. The business is not—

Q. Isn't that so? A. Please read the question.

(The preceding question was read by the stenographer.)

A. The business is not produced by that power, therefore I do not take it into account.

Q. The extent of the business operated—

Mr. GREEN. Let the witness finish his answer.

Mr. COTTER. Had you finished the answer?

The WITNESS. I have finished the answer.

Q. Put the question this way. You and I are not going to split hairs upon words, are we, Mr. Warner? A. It is not my intention to do so.

Q. Well, if you do not I will try not to. You do not take into consideration the extent of the business of this concern which is operated by water power, in obtaining the valuation that you have testified to here? A. I do take into account the extent of the business, but not the money amount of it.

Q. When you valued this water power of the Holyoke Water Power Company, the part which is attached to its electric plant, what did you consider the business of that electric plant and its extent, that was operated by water power? A. I considered that its extent was an average load of 79 kilowatts for 97 per cent. of the time, 365 days a year.

Q. That is, you took into consideration the load on the plant? A. I took into consideration the load on the plant and the character of the load.

Q. But did you not take into consideration what that load would sell for? I am right about that, am I not? A. Just a minute. I did not.

Q. Where is the location of this so called modern or ideal plant which you use by comparison for obtaining the present valuation of the present electric light plant of the Holyoke Water Power Company? You said about two miles from City Hall? A. I am obliged to answer that, if I may, by saying that I have constructed no imaginary, ideal plant. I only make that answer in order to be clear.

Q. I did not use the word "imaginary." A. Probably I misunderstood you. Will the stenographer kindly read the question?

Mr. MATTHEWS. Brother Brooks used the word "ideal."

Mr. BROOKS. "Modern or ideal." If we are going to fuss around on a word we probably shall be a good while.

Mr. COTTER. Do you understand the question, Mr. Warner?

The CHAIRMAN. He asked you where you constructed this sort of plant that you have testified about. You can answer that.

The WITNESS. If it is desired to learn the location for this new and modern plant which I have in mind I can readily answer that.

Q. Was there a great deal of doubt in your mind about that? Did you have a good deal of doubt in your mind as to what my meaning was? A. I did, yes, sir, a good deal.

Mr. MATTHEWS. I thought you meant something entirely different. I thought you meant where was this plant in Woburn.

Q. What is the location, two miles from City Hall, of this alleged modern plant which you use by comparison for obtaining the value of the electric plant of the Holyoke Water Power Company? Have you any doubt in your mind what that means? A. Not enough to prevent my answering it.

Q. Well, that is a wonder. A. The proposed location of a new and modern plant for this service was taken as at a point approximately two miles up the Connecticut river, above Holyoke.

Q. Whose land, and where are you going to anchor this modern spot? A. I was informed that land could be had a mile and a half to two miles above the city.

Q. Whereabouts? A. I have told you as geographically as I can.

Q. Where is this particular spot to be anchored, a mile and a half or two miles from the city? A. I have assumed—

Q. Can you answer my question? A. I can if you will give me a chance, I think.

The CHAIRMAN. He has asked you where the place is.

The WITNESS. I say, your Honor, it was within two miles of the City Hall.

Q. Well, whereabouts? Is it on the river bank, or is it a mile from the river bank, or where is it, this ephemeral spot? A. It is near enough to the river to afford an opportunity to receive from the river—

Mr. GOULDING. I object.

A. (continued) —condensing and feed water.

Mr. GOULDING. I ask to have the testimony stricken out.

The CHAIRMAN. We will get along very much easier if you will answer the question definitely and come right to the point in your answer.

Mr. BROOKS. We want this answer stricken out.

The WITNESS. I am sure you misunderstood me. I will endeavor my best to do it.

The CHAIRMAN. What he is trying to get at is the location of this place.

Mr. BROOKS. We ask to have the answer stricken out as far as it has gone.

The CHAIRMAN. I didn't hear it.

(The last preceding question and answer were read by the stenographer.)

Mr. BROOKS. I have got a map that has been already used in the case.

Mr. GOULDING. We ask to have that answer stricken out.

The CHAIRMAN. Strike it out, Mr. Stenographer.

Mr. GOULDING. We asked simply where the location of the spot is, if it has any location. If it has not, he can say so.

The CHAIRMAN. Strike it out.

Q. Whereabouts on this map would you say that this particular spot was located that you have in your mind for this so called modern plant? A. Well, this map—

Q. Where is the City Hall? A. Perhaps you can show me City Hall.

Q. Yes. (Indicating.) A. I have a scale. That map goes less than a mile and a half from the City Hall.

Q. Well, where are you going to put it? That map goes further, doesn't it? A. There is no drawing on it. There is a piece of paper which might be used to identify it.

Q. Can you put your finger anywhere on the map and tell us about where you are going to have this place upon the surface of the earth? A. I cannot put my finger on the blank page and tell you anything closely.

Q. Who owns the land? A. What land?

Q. Don't you understand my question? A. I do not.

Q. What land did you think I was talking about? A. I haven't in mind.

Q. What land did you think I was talking about? A. I didn't think anything about it.

Q. What land do you think I am talking about? A. I am afraid I can't answer that without being impertinent.

Q. Well, I am going to repeat my question. Who owns this land? A. I don't know what land you mean.

Q. Is that honest? A. Yes, I think it is honest. I am under oath. I intend to be honest.

Q. You haven't any notion what land I mean? A. Is that a question?

Q. Well, I should assume it was. A. I thought it was a statement.

Q. It had an interrogation point as big as a hoe. A. I didn't see the interrogation point. (To the stenographer.) Will you read the question?

(The question, "You haven't any notion what land I mean," was read by the stenographer.)

A. Yes, I have a notion what you mean.

Q. Well, pursue your notion. Who owns that land? A. My notion is that you desire to learn—

Q. Can't you answer my question? A. You asked me if I had a notion.

Q. No, I didn't ask you any such thing. A. Please read the question.

(The preceding question, "Well, pursue your notion. Who owns that land?" was read by the stenographer.)

The WITNESS. The question before that.

Mr. BROOKS. You answered that.

The WITNESS. Will you read the question before that? I have not answered it. I will try to answer it.

(The stenographer read the preceding question: "You haven't any notion what land I mean?")

The WITNESS. The last question, then, is "Pursue your notion?"

Mr. BROOKS. (To the stenographer.) Give him the last question.

The WITNESS. Give me the last question.

(The stenographer read: "Pursue your notion; who owns that land?")

Mr. BROOKS. That is it.

A. Pursuing the notion, my notion is—

Q. Who is it owns this land? A. Will you allow me to finish my question?

Q. Your question? No.

By Mr. COTTER.

Q. Who owns the land, if you know, Mr. Witness? A. Who owns what land?

By Mr. BROOKS.

Q. Oh! Has there any sudden intellectual failure stricken you this morning?

The CHAIRMAN. That is not a fair question.

A. That is an impertinence; I do not desire to answer that.

Mr. GREEN. You need not answer that. *You* will have to be a gentleman on the stand, anyway.

The WITNESS. I will try to.

Mr. BROOKS. Yes, oh, yes.

Q. You say now, do you, again, that you do not know what land I refer to and haven't any idea? A. I certainly do, the way you interrupt me.

Q. You do say that you do not know? A. Yes.

Q. Who owns this land upon which you say you would erect your alleged modern structure two miles up the river from the City Hall? A. I do not know.

Q. Where is it situated; bordering on the river? A. Yes.

Q. Next to the river? A. Bordering on the river.

Q. Next to the river? A. It might be.

Q. Well, is it? A. I do not know.

Q. On which side of the Boston & Maine Railroad track is it? A. I cannot tell you.

Q. How far from the river is it in feet or miles? A. I cannot give the exact distance.

Q. Can you approximate the distance? A. Yes.

Q. How far approximately in distance is it from the water of the river? A. I should say within 1,000 feet.

Q. Have you ever seen that? A. I have.

Q. When? A. A great many times.

Q. Riding by on the cars? A. Yes.

Q. Well, now, can't you tell me whether the Boston & Maine Railroad is between this land that you have selected for your alleged modern structure and the water of the river? A. You ask me if I have seen the land; I have seen all the land between the dam and Northampton.

Q. You have ridden by on the cars, have you? A. I have, a number of times, yes.

Q. Where is the Boston & Maine Railroad location with reference to this spot of land that you would anchor your modern structure to? A. Well, I do not think I can tell you exactly.

Q. What are the dimensions of it?

Mr. GREEN. Do you mean the dimensions of the piece of land that he would select?

Mr. BROOKS. That he did select. I do not think there can be any doubt about the meaning of that.

Mr. GREEN. There is quite a difference between "did select" and "would select."

Mr. GOULDING. There cannot be any difference in the land, whatever mood it may be in.

Mr. GREEN. There may be a considerable piece of land out of which he could select a site, without saying "I place it here or here."

Mr. GOULDING. The difference between you and the witness is that you are candid and he is not. He can tell us, but he will not.

Mr. GREEN. He has not been asked yet so that he could.

A. The land has an area—the land which I assumed has an area of 40,000 square feet.

Q. Have you been onto this particular plot of land? A. I do not know whether I have or not.

Q. Do you know of any measurements made of this particular lot of land? A. No.

Q. That you have selected? A. No.

Q. Do you know anything with reference to the character of the soil, whether rock or quicksand or what not? A. Well—

Q. Of your own knowledge? A. Not from any borings or personal investigation made by myself.

Q. No. How high above the river is it? A. I cannot tell you.

Q. Can you approximate? A. I cannot.

Q. How many hundreds of feet above the river? A. I think I can approximate the number of hundreds of feet above the river.

By Mr. MATTHEWS.

Q. Above the river? A. Yes.

By Mr. BROOKS.

Q. Have you considered whether anybody had water rights in the river opposite this particular spot that you have in your mind's eye? A. I have considered that, yes.

Q. Have you found out whether there were any existing water rights or not, from any personal investigation? A. I have assumed—I have assumed that there could be done here

exactly what is done in a great many hundreds of similar plants—water drawn from a river for feed and condensation without charge from any one.

(The question was read at Mr. Brooks's request.)

Mr. BROOKS. I ask that the answer be stricken out, may it please your Honors.

Mr. MATTHEWS. If your Honors please, the term "water rights" is a very vague and indefinite expression.

The CHAIRMAN. He is asked from personal investigation whether there are any water rights connected with this. As I understand the answer, the answer is not responsive. (To witness.) Now answer the question as you understand it.

Mr. GOULDING. I understand the answer is stricken out?

The CHAIRMAN. Yes.

The WITNESS. (To the stenographer.) Read the question. (The stenographer read the question, as follows:

"Q. Have you found out whether there were any existing water rights or not, from any personal investigation?")

The CHAIRMAN. On this particular piece of land which is referred to.

The WITNESS. Your Honor, I am obscure as to the question of water rights; I do not know what he means. The term "water rights" has been used here in several senses. I must understand the question before I answer it.

The CHAIRMAN. If you do not understand it, you need not answer it.

The WITNESS. I did not understand it.

Mr. BROOKS. (To the stenographer.) Repeat it; see if he will understand it upon repetition.

The CHAIRMAN. He says he does not understand it.

Mr. MATTHEWS. I should say that the oftener the question was repeated, the more obscure it would appear.

Mr. BROOKS. Oh, I have no doubt of that; it is time for you to say it is obscure to you. You usually back up their witnesses in their obscurity.

Mr. MATTHEWS. I said so at the outset; I do not know what you mean by it. Do you mean water rights appurtenant to this land, or do you mean water rights where this land is the servient estate?

Mr. BROOKS. He can take it either way. I will tell you what I meant. I ask him the question as to whether or not from any personal investigation that he has made he has discovered whether there are any water rights that go with this land or any water rights that go with the land between it and the river.

The WITNESS. I do not understand what you mean by water rights.

Mr. BROOKS. Ah!

Mr. MATTHEWS. It seems to me, Brother Brooks, it is a fair assumption that your question meant this—

Mr. BROOKS. Never mind; I do not ask your assumption of the meaning of the question. Let it go.

Q. Do you know what rights the riparian owners have in the water of the river from any personal investigation that you have made, that extends between the proposed location for your modern plant and the water of the river? A. That involves a question of the state laws, with which I am not familiar.

Q. Have you been informed by anybody who was the owner of this land upon which you would place your so-called modern structure?

The WITNESS. (To the stenographer.) Please read that question.

(Question read.)

A. I have not been informed by anybody who was the owner of the land.

Q. Has the plot of which this land is a part any name? A. It probably has.

Q. Yes; what is it? A. I do not know.

Q. Never heard it? A. I cannot say that I did.

Q. Now, have you made an investigation to determine what rights the Boston & Maine Railroad have in that vicinity? A. I have not.

Q. Mr. Warner, is there any electric plant in any city in Massachusetts of an inhabitancy of 50,000 or over that is built in accordance with the plan that you have specified here? A. There has not been built, to my knowledge—

Q. Well, you can answer my question yes or no, if you know.

The CHAIRMAN. Yes, you can answer that question yes or no, if you know.

A. Well, he says in accordance with this plan I presented here. I want to answer it as fully as I can. I should have to say no.

The CHAIRMAN. You can explain yourself.

The WITNESS. That is what I want to do.

The CHAIRMAN. Go on.

Mr. BROOKS. Let me ask this question; perhaps it will help him, because he finds fault with the question—I presume very justly—

The WITNESS. Not at all, not at all.

Q. Is there any electric plant in any city of Massachusetts of an inhabitancy of 50,000 people or more that is built in accordance with your idea of good engineering practice? A. I am not prepared to answer that question.

Q. Do you know of any? A. I said I was not prepared to answer the question.

Q. I ask you now, do you know of any? You are prepared to answer that, aren't you? A. I cannot swear here that I do.

Q. What? A. I cannot swear now that I do.

Q. What city in New England or town in New England had your system of producing and distributing electricity in January, 1898? A. Had what system?

(Question read.)

A. If you by that refer to the 2-phase system at 60 cycles, I have in mind—

Q. I refer to the entire system that you adopt for this case and shown on diagram 6. A. There are no two plants in the world alike entire as to systems, so far as I know.

(The last two questions were read.)

A. I answered that.

Q. Well, I repeat it now; I submit you did not answer it.

The CHAIRMAN. I think you did not.

(The answer was read.)

Mr. GOULDING. I ask to have that struck out.

The CHAIRMAN. That is not an answer to the question, Mr. Witness; that may be struck out.

The WITNESS. Strike it out and read the question again.

(The question was read again and Mr. Brooks added "for the purposes of arc lighting.")

A. The question is obscure; I cannot answer it.

Q. You cannot answer it? A. No, you have strung something else on there which mixes it up.

Q. Do you know of any town or city in New England now that had the system recommended by you for this case in January, 1898, for the purposes of arc lighting? A. I cannot recall any at the present time.

Q. What cities or towns in New England have this system at the present time? A. I have in mind the following towns which have this system at the present time—

Q. For arc lighting, of course? A. Now, there is a new question asked before I was able to answer that. (To the stenographer.) Will you read the new question?

(The question was read as amended.)

Mr. GREEN. Do you mean for arc lighting alone, or for arc lighting as a part of the general—

Mr. BROOKS. I meant just what I said—for arc lighting.

Mr. GREEN. I do not think the question is plain. It may mean, have it for doing nothing but arc lighting, or have it for doing arc lighting among other work. It might mean two entirely different systems, and I think the witness is entitled to know which he means.

Mr. GOULDING. In that case they would have it for arc lighting, if they have it for arc lighting and something else.

Mr. BROOKS. I will put it again. These obscurities I want to remove, because I have no doubt it is due to my own obtuseness.

Q. What cities of New England or what towns of New England have your proposed system for this case which they use for their entire arc lighting? A. For their entire arc lighting?

Q. Yes. A. I believe the city of Hartford uses this system for its entire arc lighting at the present time. I am morally certain that it uses it for a great majority of it; I believe for all. I am informed and believe that the city of Wallingford—or town—uses it.

By Mr. GREEN.

Q. Wallingford, Conn.? A. Yes. I believe the cities or towns of Warren—

By Mr. MATTHEWS.

Q. Warren, Mass.? A. Warren, R. I.; and Bristol and East Greenwich are so lighted.

By Mr. BROOKS.

Q. Have you completed? A. I have not. I believe the city of Braintree—

Q. I have not asked for your belief in this case yet— A. Well—

Q. I am asking you for your personal knowledge of the subject matter of this question.

Mr. MATTHEWS. First you were not getting enough information; now you are getting too much.

A. To my personal knowledge—to my personal knowledge the town of Braintree operates a plant substantially on this system.

Q. For all its arc lighting? A. For all its arc lighting. To my personal knowledge the Woburn Electric Light & Power Company—I believe is the name—does all its arc lighting in the territory through which it operates under this system. Those, I believe, are all the plants I have in mind at this moment.

Q. Well, all that you know of personally are the two, Braintree and Woburn? A. Oh, I cannot say that.

Q. Well, are there any others that from your personal knowledge you can say operate your system now for all their arc lighting? A. I have personal knowledge of the installation at Hartford. You asked me here suddenly to declare whether they had thrown out all their constant current arc machines, and I cannot swear that they have.

Q. I have asked you no such question, or any question that can be tortured into any such assumption.

Mr. MATTHEWS. You have asked him questions involving that.

Mr. BROOKS. I have asked him no such thing.

Q. You have two stations in your schedule depicted; one of 725 kilowatts and one of 575 kilowatts, as I understand it? A. That is correct, I believe.

Q. Yes. How much of the rated capacity of these two so-called modern stations can be distributed and sold to customers

with the distribution apparatus and lines that appear in your schedule or your plans? A. All of it.

Q. Have you made a calculation to determine that? A. I have made a swift mental calculation to determine it.

Q. Would you be surprised to find out that the amount was considerably less than you had provided for than either your 575 or your 725? A. What amount? The amount that I could distribute through this system?

Q. Yes. A. I think I would confess to some surprise.

Q. You think you would? A. Yes.

Q. Through what streets do you propose bringing your new lines from the so-called modern station that is located somewhere in the vicinity of two miles up the Connecticut? A. I have made no effort to determine that.

Q. Then how can you determine the cost of pole line construction? A. I have assumed that the station will be two miles—not exceeding two miles—from the City Hall.

Q. You have made no calculations of the streets through which you would run your wires or have your poles? A. I believe I have said I have not.

Q. Now, can you tell how you obtain the amount of expenditure for your poles and wires necessary if you do not know the streets through which you will make your distribution? A. I have taken the distance, the limiting distance.

Q. On the theory of a straight line? A. Well, in limiting distance of two miles it may be a crooked line.

Q. It makes all the difference in the world, doesn't it? A. No, I do not think it does.

Q. The number of the corners? A. It does not make a very great difference.

Q. How many poles have you calculated for? A. How many poles have I calculated for?

Q. Yes.

Mr. MATTHEWS. Do you mean in the whole system or in that two miles, Mr. Brooks?

Mr. BROOKS. In that same line; he will understand that. He will not be so obscure as you are on that question.

Mr. MATTHEWS. I may be obtuse; but the question is obscure.

(The witness proceeded to make a computation.)

Mr. BROOKS. It might be as well, may it please your Honors, to suspend here; it is near one o'clock.

The CHAIRMAN. Don't you want some more information bearing on this subject?

Mr. BROOKS. I shall, but I do not now. I have understood—he has told my friends upon the other side that he had all the details for his estimates.

Mr. GREEN. He may not have had this particular two miles picked out and the poles for these two miles put by themselves. He may have to subtract.

Mr. BROOKS. I am only saying what he told you. I will try and refrain from any more mathematical problems, for the sake of saving time.

(Noon recess.)

AFTERNOON SESSION.

ROBERT L. WARNER, *resumed.**Cross-examination by Mr. BROOKS, continued.*

Q. Mr. Warner, I understand the question pending was, in substance, how many poles you would use in bringing your new lines from your ideal or modern station, two miles up the river, to the centre of the city, and how many you allowed for in the calculation comprehended by your schedule? A. As nearly as I can determine from the memoranda I have, I allowed 90 poles for carrying the lines from the proposed location of the modern plant, within an extreme limit of two miles from the centre of distribution.

Q. That would be how far apart? A. That would be 117 feet apart, I think.

Q. And you don't know now through what streets you would bring them? A. Well, I didn't know before lunch; I don't know now.

Q. Can you tell me or, rather, give us a detailed statement, showing the proposed location and sizes of the transformers that you propose using? A. I cannot.

Q. Have you calculated upon the location, sizes and numbers of transformers that you would use for this purpose, in your schedule that has been introduced in evidence? A. I have included in the schedule transformers sufficient for the service.

Q. That wasn't my question. A. (To the stenographer.) Please read the question.

(The preceding question was read by the stenographer.)

A. I have covered that cost in the schedule.

Q. Doesn't the cost depend upon the sizes? A. It depends to some extent upon the average size.

Q. Doesn't it depend upon the individual size of your transformers? A. To the extent that individual sizes go to make up an average, it does.

Q. Which cost more proportionally, small or large transformers? A. Small ones.

Q. Now I will repeat my question, whether or not you have included in your schedule the number and sizes of the transformers that you propose using? A. I think I understand you better now, and I have not included a calculation of the number and sizes of transformers to supply the exact service now in force from house to house.

Q. Doesn't the amount of wiring depend upon the number and size of the transformers? A. Not necessarily.

Q. Doesn't it depend upon the number, size and location of the transformers? A. Not necessarily.

Q. Well, I don't know what you mean by "not necessarily."
A. It depends—

Mr. GREEN. You may explain it, if you wish.

The WITNESS. I can explain it.

Q. Can you tell the size of your wire without knowing the number, size and location of your transformers? A. I could tell it approximately.

Q. If you don't know the size, number or location of the transformers, do you mean to say that you can tell approximately the size of the wire? A. I do mean exactly that.

Q. What size of wire do you use? A. I have not figured out the exact sizes of wire.

Q. Then it comes to my original question. You have not comprehended in your schedule the size, number or location of your transformers? A. You say the number, size or location?

Q. And location. A. The three things. No, I have not.

Q. Have you allowed anything for line loss in your schedule, and if so what is the line loss that you have allowed for in your schedule, and where does it appear? A. I think I may have to search through some memoranda to determine. I can take the time to do it.

Q. Can't you do it now? A. You mean quickly, off-hand?

Q. Yes. A. Without going through the memoranda?

Q. Yes. Can't you tell me now whether or not you have allowed for the line loss in your schedule, and what the line loss is that you have allowed for? A. My recollection is that I did allow for the loss on the lines in the schedule.

Q. How much, and where does it appear? A. I believe that I can answer that question by an explanation.

Q. Well, I don't want the explanation. A. Well, I mean—

Mr. GREEN. Just a moment. You have got two questions in one there, Mr. Brooks.

Mr. BROOKS. I am not shutting you off from an explanation, you understand, but I would like an answer to the question.

The WITNESS. Yes. (To the stenographer.) Will you read the question?

(The preceding question, "How much, and where does it appear?" was read by the stenographer.)

A. My recollection is that I figured on a line loss from the proposed power station to the centre of distribution of 5 per cent. That is my recollection. That percentage does not, so far as I now recall, appear in the schedules.

Q. Where does the calculation appear in your schedule, in amount, irrespective of percentage? A. In item number 2 on page 28, item number 2 under heading number 8, Schedule C.

Q. Is this amount 5 per cent? A. This amount is the result of the calculation.

Q. That is hardly an answer. A. Well, it is an answer—

Mr. COTTER. Is it 5 per cent., is the question.

The WITNESS. 5 per cent. of what?

Q. Does this represent the 5 per cent. that you just spoke of a few moments ago as being your allowance? A. Why, \$2,655 cannot be 5 per cent. of the line loss.

Mr. COTTER. Then you can answer that by saying it does not, can't you?

The WITNESS. It does not, then.

Q. Does this represent the cost of the wire if there is a 5 per cent. line loss? A. To the best of my recollection it does.

Q. How many kilowatts do you calculate that this wire will transmit—725? A. Are you going to answer the question or do you wish me to answer it?

Mr. GOULDING. I object to that kind of insolence on the part of the witness.

The WITNESS. I beg pardon, I intended no insolence.

Mr. COTTER. That is a proper question, and if you will give attention to it and then answer it.

(The question was read by the stenographer.)

A. There are two questions there. I cannot answer them both.

Mr. GOULDING. I submit there is but one question to answer.

Mr. GREEN. I think it is difficult to answer that question yes or no.

Mr. BROOKS. I do not know that you are called upon to express an opinion upon it.

Mr. COTTER. Deal with the last branch of the question, if you understand there are two. Is it 725?

The WITNESS. It is not 725.

Q. How much? A. The load at present on the plant—

Q. Well, how much? I don't care about the load. A. I estimate that the average load—

Q. I am not asking that.

Mr. GREEN. I think he is answering just the question asked.

Q. I am asking how many kilowatts. I do not care for the processes. I would like to have an answer to my question if it is a proper one; if it is not, I will frame one. A. That question cannot be answered categorically. There are no instruments in the plant to show how many kilowatts pass out of the plant.

Q. I asked you, did I not, how many you had provided for by this wire? A. Well, I think I can answer that. I will try to answer that. I have provided for an average load of 79 kilowatts.

Mr. COTTER. He asked how many.

The WITNESS. Well, 79 average.

Q. 79 what? A. 79 kilowatts average load.

Q. Don't you provide for the maximum load? A. I do provide for the maximum load.

Q. How many kilowatts do you provide for these wires on the basis of the maximum load? A. Well, that question is not clear; it cannot be answered.

Q. You told me this morning, didn't you, that you had provided for the distribution from this ideal plant, in the lines of distributing apparatus, for the distribution of all 725 kilowatts? A. I don't recall whether I said so or not.

Q. Did you so provide? A. I provided for a load which is at present carried in the distribution lines.

Q. That is not my question. Do you provide for 725 kilowatts by this wiring that I have already referred to? A. You mean the distributing lines?

Q. Yes. A. I do not, except—

Q. Do you provide for 300? A. I have not finished the answer. Except at a slightly increased line loss.

Q. You do not provide for 725 kilowatts, do you? A. I do, at a certain line loss.

Q. How much line loss? A. I have not computed that.

Q. Will you compute it? A. Why, it is a computation I prefer not to make on the stand. I will be glad to compute it later.

Q. It wouldn't take but a minute. A. I have no tables with me, and I prefer not to make that kind of computation on the stand.

Q. Did you provide for the distribution of 400 kilowatts, at 5 per cent. line loss? A. Not at 5 per cent. line loss, no.

Q. You say you allowed 5 per cent. for your line loss—you just told me a moment ago. Now, on the basis of a 5 per cent. line loss how many kilowatts do you provide for, to distribute? A. Well, I started this whole answer by saying that I had not the figures before me, but I was going to answer it approximately from memory, without going back to that detail. Now if you desire to go into it with great care it will be necessary for me to get my memoranda.

Q. Approximate it. A. On the basis of an average 5 per cent. line loss, it is my recollection that I provided for the distribution of approximately 80 kilowatts for those lines.

Q. How many? A. 79 or 80.

Q. On the basis of a maximum 5 per cent. line loss, what is the number of kilowatts you provide for? A. That is a question which cannot be answered in that way. I will answer it.

Q. You say you cannot answer it? A. I can answer it if you will allow me to. The load varies from a very small load to about 292 kilowatts.

Q. What has that got to do with it? A. The loss in this line which I have provided will vary from a very small loss up to a percentage which I do not know and have not in mind; an average of 5 per cent., as I recall it.

Q. Can you tell me the details of your line that you purpose

to run ; how many wires, the sizes of the wires? A. No, I cannot. I haven't them here.

Q. How many incandescent lights, and what horse power of motors, have you provided for in this schedule that comprehends your distribution system for your ideal plant? A. An incandescent load—

Q. Well, is this answering my question? A. It is answering your question.

Q. All right. A. —totalling, maximum, 64 kilowatts, both alternating and direct, as at present carried ; a power load totaling a maximum of 54 1-2 kilowatts from the switchboard. Those are the incandescent lighting and power loads which I have employed.

Mr. BROOKS. Now I am going to repeat my question that I asked before. I submit that it was not an answer to my question. I asked for how many incandescent lights and what horse-power of motors he had provided in his schedule for his ideal plant. I am going to hang to that or die in the attempt.

By Mr. COTTER.

Q. Can you answer it any more specifically? A. I think I could answer it a little more at length.

By Mr. BROOKS.

Q. I am only asking about number. A. I have not the calculation made in that way.

Q. If you say you cannot tell me, that answers my question. A. Oh, I can tell you ; I can tell you approximately—

Q. Then tell me. A. —by taking time to consider ; but I have not the calculation made in that way.

Q. How long will it take you? A. I cannot say. I have made the calculation in kilowatts, the maximum load. In order to reduce that to the horse power of motors, or incandescent lights, either actual number actually burning or actual number connected with the lines, I should have to consider a good many things. It might take me a couple of hours to arrive at an answer which I would be willing to make in those terms.

Q. Could you lay out your transformer system for your motors without knowing the number and sizes of your motors? A. I could lay it out sufficiently for a safe estimate of cost.

Q. Could you lay it out accurately? A. Not accurately enough to send men out to put up the transformers, no.

Q. Could you tell it accurately enough to tell the cost? A. To tell a safe cost, yes.

Q. Within what per cent. would you say is safe? A. I cannot answer you.

Q. Well, now, will you tell me from any figures that you have on your schedule, how many incandescent lights and what horsepower of motors and how many motors you have provided for in your ideal plant? A. I am constructing no ideal plant. I object to that term. I do not think it is an ideal plant.

Q. You went along now for a few minutes without objecting to it. A. You put it in about every tenth question. I object to that characterization of the plant.

Q. Make it the so-called modern plant. A. It is a practical modern plant.

Mr. GREEN. I would like to know if the witness has not answered the question five or six times?

Mr. BROOKS. He has not.

Mr. GREEN. I think he has. He said he could not figure it reduced to lamps; he has figured it out in kilowatt capacity.

Mr. COTTER. It will save time to have him answer instead of looking back to see.

The CHAIRMAN. I think there is a good deal in that.

Mr. BROOKS. I do not agree for a moment that he has answered it; he agrees himself he has not. He says it would take some calculation for it.

The CHAIRMAN. He wants the question read, as I understand it.

The WITNESS. I did not ask to have it read.

Mr. GREEN. I asked to have it read, and I would like to have it read.

(The question was read.)

A. I cannot now tell you.

Q. Are you a salesman for the Westinghouse Company of this 2-phase system that is depicted in picture No. 6?

The WITNESS. (To the stenographer.) Please read that.

(The stenographer read: "Are you a salesman for the Westinghouse Company of this 2-phase system"—)

The WITNESS. Is that "of this 2-phase system"?

The STENOGRAPHER. Yes.

The WITNESS. Go on.

(The question was completed.)

A. I do sell for the Westinghouse Company the principal parts or many of the principal parts of the electrical apparatus involved in the use of that system, yes.

Q. What portion do not you sell in your position with them of that system pictured in No. 6? A. I did not quite get that; will you read it?

By Mr. COTTER.

Q. What portion don't you sell? A. The copper lines I generally do not sell—generally, I say, I do not sell; usually I do not sell incandescent lamps; sometimes I do. Usually I do not sell arc lamps; sometimes I do. That covers the subject fairly.

By Mr. BROOKS.

Q. Well, with those exceptions you are a salesman for them of this particular system, as I understand? A. You might say so—

Q. Well, would I be inaccurate— A. (Continued.) I think I would say yes.

Q. What is your territory? A. I do not think I care to answer that question.

Q. Why not? A. There are a number of reasons why I do not care to answer it. I think that the question affects my personal relations with the Westinghouse Company. I believe I have testified in a general way to the character of the work I do—

Q. I didn't want you to argue with me about it. A. And I believe that I do not feel called upon to answer that question.

Mr. COTTER. He can state what he does in Holyoke. We do not think, Mr. Brooks, that we will require him to testify just where—

Mr. BROOKS. I submit that he did in the direct, your Honor, in a general way.

Mr. GOULDING. He has given himself a qualification here. Now we desire to show that the qualification is not accurately given. A man comes here as an electrical engineer, who we say is a salesman for a certain particular concern, and that he is not consulted as an engineer and never was to any extent, or ever re-

ceived any compensation for any such service. He is simply a salesman for this purpose. That is to say, the question assumes that.

Mr. COTTER. The territory that he travels in or makes sales in would not help you very much, would it?

Mr. BROOKS. Well, in one phase it might, and in another phase it might not. It would depend somewhat upon his reply.

Mr. COTTER. Anything that has a tendency to contradict what the witness said in his direct examination we do not mean to preclude you from.

Mr. GREEN. The witness stated what plants he had installed.

Mr. COTTER. Yes, I so understood it. He alluded to plants. If you can show that he did not install these plants or any other one—

Mr. BROOKS. I will show you the exact question in a moment.

Mr. GOULDING. We want to show what his business was, if we are allowed to.

Mr. COTTER. Certainly. But whether he sold goods in one town or another I do not think we care to inquire into, unless it be for the purpose of contradicting him.

Mr. BROOKS. Perhaps I will change my question.

Q. Are you their salesman in southern New England of this system, with the exceptions that you have already mentioned?

A. Well, I should—it is very difficult to give a direct short answer to that.

Q. Yes, I suspected it. A. I am glad you anticipate me. I am called on by the Company to do a number of things which I do not care to testify to here.

Mr. GOULDING. He says he does not care to testify in answer to the question.

Q. Did you say that you did not care to answer that question?

A. I did not say so.

Q. I asked you if you did say so.

The WITNESS. Please read the question again?

(The question was read: "Are you their salesman in southern New England of this system, with the exceptions that you have already mentioned?")

The WITNESS. And the answer.

The stenographer read: "I am called on by the Company to do a number of things which I do not care to testify to here."

The CHAIRMAN. You stated that you had charge of their business—

The WITNESS. I thought I answered that it was difficult to answer the question directly.

(The stenographer read: "Well, I should—it is very difficult to give a direct, short answer to that.")

The WITNESS. Yes, that is what I said—it is very difficult to give a direct, short answer to that question.

Mr. BROOKS. As I understand it, he has been into a history of his connection with this Company, and he has given quite an extensive autobiography of his experiences with this Company.

Mr. COTTER. We are agreed, gentlemen, that except as it has a tendency to contradict something that the witness has said, his private relations with some concern and just what he does we do not think are very material, and we do not think it would be profitable to press the inquiry to that extent.

Mr. GOULDING. We had supposed—of course, if your Honors have ruled in this matter we do not expect to be heard in argument, however surprising the ruling may be. We supposed that in cross-examination of the opposite party's witness we were not confined to things that contradicted him, but were only confined to things that are material.

Mr. COTTER. Yes.

Mr. GOULDING. Now, the materiality of this question is the experience of this man. If we can show that he has been driving a tipcart all the time during which he claims to have been a consulting engineer, I think we would have the right to show it. If we can show that he has been a salesman for some company that sells this kind of apparatus and that that has occupied his time, we think it is a material inquiry, because his qualifications are material, and we think that we are not confined—with great deference to this Commission—to what is merely contradictory of what he says, as though we were trying to impeach a witness.

Mr. COTTER. Our understanding of the situation is this: the witness has already testified that he has been a salesman—we remember, of course, what he said in the direct examination.

Now we believe that the recent inquiries had reference to his personal business and where he has sold, where he acted for this house that he is connected with. We do not think that part is material. We are not confining you to the contradiction at all, but what he did. That is consistent with the ruling that we made when the petitioners were putting in their case. We then ruled that the inquiry of a witness upon the stand about his personal connection with his house, where he sold goods for that house and under what terms and condition,—we would not permit the inquiry to be made.

Mr. BROOKS. I have not asked him that, may it please your Honor.

Mr. COTTER. We felt that it was approaching it.

Mr. BROOKS. I have found the question. It is on page 1320, the third question from the bottom:

“Q. And what work did you take charge of and what work have you installed since you came? A. I took charge of commercial and engineering work in southern New England, and I have been engaged in that work ever since.”

Mr. COTTER. Of course it is perfectly competent, and we did not wish to be understood otherwise, for you to show that he did not take charge of that, and that he was engaged in some other business.

Mr. GOULDING. We are cross-examining him, your Honors will remember.

Mr. GREEN. It seems to me that there is a very marked difference between whether this gentleman sells goods in southern New England or western New York, and whether he is a salesman for the Company, involving the nature of his contract and what he does. He may do a thousand things; this may be one or there may be other things—a different proposition.

Mr. BROOKS. Have I not a right, may it please your Honors, to show this man's interest in this particular system?

Mr. COTTER. Certainly.

Mr. BROOKS. To show he is the salesman of this particular system, to show that when he says he is the head of their business for southern New England, it means that he is endeavoring to sell for a good price for his employers this particular system in question.

Mr. COTTER. I agree that anything that would tend to show bias or interest would be competent, and if that is the purpose of it—(consulting with the Chairman). Yes, we are agreed that that ought to be admitted if it has a tendency to show interest or bias. We did not take that view of it in the outset; at least, I did not. If that is the purpose of it, we are all agreed that it is competent.

The question was read, as follows :

“Q. Are you their salesman in southern New England of this system, with the exceptions that you have already mentioned?”

A. I cannot so define myself.

Q. Can't define yourself? A. I cannot so define myself, as their salesman in southern New England for this system.

Q. Do you have to do with the sales in southern New England of this system with the exceptions that you speak of? A. I do, yes, sir.

Q. And when you can make a sale, you make it, don't you?

A. Well, I try to, yes.

Q. That is, if you can make it for a sufficient consideration?

A. That is the proposition.

Q. Who is it that pays you for selling this mechanism, the Westinghouse Company? I will change my question, perhaps: Who is it that you derive your pay from in the selling or engineering of this system? A. I should very much prefer not to answer that question.

Mr. COTTER. We think you had better answer it. It is a fair question which you ought to answer.

Mr. BROOKS. (To the stenographer.) Read the question.

(The question, “Who is it that you derive your pay from in the selling or engineering of this system?” was read by the stenographer.)

A. In the selling or engineering of this system? I receive a salary from the Westinghouse Electric Company. Among my duties in that connection is the sale of this system—

Mr. BROOKS. I submit that is not an answer to my question.

Mr. GREEN. I think he has answered it fairly.

The WITNESS. I have other sources beside that,—

Q. I am asking you now, who is it that pays you for the sale of this particular system that we have spoken of?

Mr. GREEN. I object; just a moment. I think the first question should be read, and not the second one. I should like to have the first question read.

Mr. BROOKS. I amended the first question.

Mr. COTTER. As to the matter of the income?

Mr. GREEN. It may not be one person that pays him, or one source of income. A man should be allowed to state, I think.

Mr. COTTER. I think so too,—not the income or the amount of it. I think that part of the reply may well be stricken out, Mr. Green.

Mr. GREEN. I don't know how the witness can explain it without saying that again.

Mr. COTTER. (To the stenographer.) You may read the question.

(The question was again read.)

Mr. GREEN. He has got two questions in it,—

Mr. COTTER. I think that question may be answered, Mr. Green.

Mr. GREEN. I want to call to your attention that there are two questions in it, and the modified question that was put in the place of it only had one of them.

Mr. BROOKS. He answered that question, and then I went to work and put another one. I was trying to meet your wishes in the matter.

Mr. COTTER. We think that is a proper question. Of course he may answer it in any way that is convenient for him, but he ought to be as responsive as possible.

A. I am endeavoring to do so, your Honor, and I think I answered it; my memory may be at fault.

Mr. BROOKS. Read his answer.

(The stenographer read the answer as follows: "I receive a salary from the Westinghouse Electric Company. Among my duties in that connection is the sale of this system—")

The WITNESS. Then I added there, that I have other sources of income.

Q. I didn't ask you that. A. I think it is essential for me to say that.

Q. I didn't ask you for your other sources. A. I know you didn't, but I think it is essential for me to say that in order to be clear.

Q. Is there any plant in southern New England, which has adopted in whole or in part this system, from whom you have received pay for engineering services?

Mr. GREEN. Just a moment; I object to that myself. I think it is going altogether too far into this witness' private affairs.

Mr. COTTER. The question may be answered.

The WITNESS. (To the stenographer.) Please read the question.

Mr. GREEN. Just a moment; I want to raise one question here. It affects our witnesses—I don't care so much about this question—

Mr. BROOKS. I see you don't.

Mr. GREEN. —this one particular question, but if this Commission is going to permit our experts whom we call here to be asked to state the various companies who have paid them, or whether certain companies have paid them money, or whether certain companies have paid them for doing work, then it seems to me we are opening a scope of inquiry which involves their private affairs, and involves things which, perhaps not in this particular case but in other cases, would be very objectionable. Now, my recollection is very strong that we were limited in our inquiries—I remember in the case of Mr. Randolph in particular we were very much limited, we were not permitted to go into his private affairs at all.

The CHAIRMAN. Let us look at that. I remember something about it.

Mr. BROOKS. I want to say, your Honors—I don't know that it is necessary to say anything—that this gentleman has posed here as an engineer of central stations.

Mr. COTTER. We admitted this evidence for the purpose of showing interest or bias, not to go into private matters at all. I remember that Mr. Green did state, and the Commissioners agreed, that anything that relates to one's private business, if it

is not material here, we are not going to inquire into. We did so rule, and that is what we had in mind when we started to work on this case.

Mr. GREEN. Yes, but this man says: Yes, I do sell these machines; I do work for the Westinghouse people, and I am paid a salary, and a part of my duties are to put in these machines. Now, the question is: Have you received any income from anybody else for any work in connection with this system.

Mr. BROOKS. No such question.

Mr. GREEN. That is what it amounts to: Has any company in southern New England ever paid you anything for putting in any of these plants. Now, it seems to me we are getting down to the private business of this witness and the private business of all our witnesses.

The CHAIRMAN. Let us see what it says in that previous instance in Mr. Randolph's testimony.

Mr. COTTER. (To the stenographer.) Will you read the last question, upon which this discussion took place?

(The question, "Is there any plant in southern New England, which has adopted in whole or in part this system, from whom you have received pay for engineering services?" was read by the stenographer.)

(The Commissioners consulted.)

Mr. BROOKS. You will see this on page 401 of Vol. I, may it please your Honors, if you will take William W. Randolph's cross-examination: The question is: "Now I should like to ask you to produce all the data, memoranda, correspondence, and other information, whether you call it confidential or not, which you used as a basis for forming your valuations in this case."

Mr. MATTHEWS. Look at page 397, Mr. Brooks, and you will see what use he made of it.

Mr. COTTER. That, I take it, we excluded?

Mr. BROOKS. You did, may it please your Honors.

Mr. MATTHEWS. Notwithstanding the fact that the witness said he had used them.

The CHAIRMAN. I thought the rule was arbitrary, and I thought it was right, and I think it is right to rule this out, too.

Mr. BROOKS. Perhaps your Honors do not quite appreciate the suggestion that I have already made. He has put himself

here apparently in his direct testimony as an electrical engineer—a mechanical engineer. Now, I say a certain answer to this question would tend to contradict him in that respect.

The CHAIRMAN. In what way?

Mr. BROOKS. Because it really amounts to this, that if a certain answer is given, he is but the salesman of the Westinghouse Electric Company, and I purpose to follow that up by still another question, not asking him about any details or any private or confidential relations that he has with anybody.

Mr. GOULDING. In other words, may it please your Honors, it is simply showing whether this man has or has not had practice as a consulting engineer. Have you been compensated by any person for giving an opinion or laying out a plant—are we to be told that we cannot ask such a question as that of a man that comes in here in this way?

The CHAIRMAN. Has he been employed, that would be a proper question.

Mr. GOULDING. Been employed in a compensated employment, that is as far as our question goes now, and that is as far as it probably will go.

The CHAIRMAN. I see no objection to that.

Mr. GOULDING. If we are correctly instructed and we have a right to evolve our theory according to our instructions, he has not had any practice to amount to anything—a very limited practice as a compensated engineer.

Mr. COTTER. The question may be put, gentlemen.

Mr. GREEN. Of course our friends are not going on making that as an assertion—

Mr. GOULDING. Those are our instructions, no assertion about it. I don't know anything about it except from our instructions.

Mr. COTTER. We do not want to permit anything but what is proper. We desire to protect the witnesses' outside business; we do not care to have the private business of witnesses gone into, but so far as it is confined to this man's experience or what he did, we will permit the question to be put.

Mr. GREEN. The question is, whether he received any money out of a plant. I don't know what it means, perhaps the witness can answer it.

Mr. BROOKS. (To the stenographer.) Now, will you read the question for him.

(The question, "Is there any plant in southern New England, which has adopted in whole or in part this system, from whom you have received pay for engineering services?" was again read.)

A. There is.

The CHAIRMAN. We think that is proper.

The WITNESS. There is.

Q. What plant?

Mr. GREEN. Well, now,—

By the CHAIRMAN.

Q. Isn't there anything you can "give away" at all? A. I have very excellent reasons for desiring not to state.

Q. They want to know what engineering you have done in pursuance of your duties. A. I have attempted to cover that very fully. I very much prefer not to state from what particular plant or plants I have received compensation for engineering work.

By Mr. BROOKS.

Q. From how many plants in southern New England have you received compensation as the engineer of the electrical plant?

Mr. GREEN. Does that mean, Brother Brooks, for the engineering of how many plants has he received compensation?

Mr. BROOKS. Read the question, Mr. Stenographer, and then I will tell you.

(The question was read by the stenographer.)

Q. Of the central station?

The WITNESS. (To the stenographer.) Will you please read that question with his addition?

(The question, and addition thereto, were read by the stenographer.)

A. I can recall in southern New England at this time two.

Q. What are they? A. I very much prefer not to state.

Mr. COTTER. Well, is that material, Mr. Brooks? If the witness has an objection to answering it, we do not care to compel him to.

Q. What work did you do for those two plants?

Mr. GOULDING. I think that is material.

Mr. BROOKS. Mr. Goulding thinks I should press that other question, and I quite agree with him.

The CHAIRMAN. I think it is admissible, Mr. Cotter.

Mr. COTTER. Yes, I think it is admissible, but we would like to protect private interests if we can, if the man says he has an objection to it. If you press it—

A. You want me to answer the question?

Mr. COTTER. Yes; they insist upon it.

Mr. GREEN. You may answer, Mr. Warner.

The WITNESS. I do not see how I can properly answer that question.

Q. Do you decline to answer it? A. I say I do not see how I can properly answer that question.

Q. I ask you if you decline to answer it? If you do, I will pass on. A. I should very much dislike to decline—

Q. Well,— A. Now, I am going to be clear—I should very much dislike to decline to answer any question which the Commission consider essential, but I very much prefer not to answer that question. I do not see how I can properly do it.

Mr. COTTER. The Commission do not express any opinion as to whether it is essential or not.

Mr. GOULDING. All we want to know is, whether the witness declines to answer it.

Mr. BROOKS. If he declines to answer it, that settles it.

Mr. GREEN. (To the witness.) If you could answer it without any violation of any personal confidences between yourself and clients, we should be glad to have you.

The WITNESS. You would prefer to have me do it?

Mr. GREEN. Just a moment; let me see.

By Mr. GREEN.

Q. Do you think that by consultation with any parties with whom you have acted it would make it easier for you to answer it? A. I shall have an opportunity to confer with them within 24 hours.

Mr. GOULDING. It seems to me it is somewhat irregular to consult with counsel on the other side in cross-examination on an answer of that sort. The witness has his choice to answer or leave it, and I think we have the right to have him do one or the other.

The CHAIRMAN. If you do not feel like answering the question, why don't you decline to answer it?

The WITNESS. For the reason, if you please—

The CHAIRMAN. Do something about it.

The WITNESS. For this reason, that I am not familiar with what effect such a declination would have.

The CHAIRMAN. That is not for you to consider. It is not for you to say. If you do not choose to answer that question you have a perfect right to decline to answer it, and counsel can pass on. What the effect of it is is not for you to determine. You have a perfect right to say you decline, if you wish.

The WITNESS. I think I will decline to answer the question.

By Mr. BROOKS.

Q. Very well. Did you receive any pay for engineering from the Narragansett Electric Lighting Company, of Providence?

A. Not from the Narragansett Electric Lighting Company.

Q. You can answer my question yes or no. A. No.

Q. Did you receive any pay from the Silver Springs Bleaching and Dyeing Company, of Providence, for engineering? A. By a process of elimination—

Q. Answer that yes or no. A. I think that leads up to the same question which I declined to answer, and I think I would prefer to stop on that account.

Q. Do you decline to answer that? A. Well, I dislike to be in the position of declining.

Q. If you say you decline, I am going right along, I am not going to spend any time. A. If you get me to decline to answer all but one or two plants in New England you may be able to find out.

Q. Well, you pay your money and you take your choice. A. I do not wish to decline to answer questions—

Q. Well, you need not argue with me about it at all. A. —in any way which may seem to show disrespect for the Commission or lack of desire to qualify, but my feeling is that I have qualified on the subject.

Q. That may be your feeling. A. I have declined to answer a certain question. You are trying now—I beg pardon—but this process leads me to answer it—

Q. I do not need any argument about this. A. Well, I think I will decline to answer it.

The CHAIRMAN. He has declined to answer it.

Q. Did you receive any compensation for engineering from the People's Tramway plant? A. I think I will decline to answer it.

Q. From the Braintree Municipal plant? A. I will decline to answer it.

Q. From the Hartford Electric Light Company? A. I will decline to answer it.

Q. The Windsor Locks Electric Light Company? A. I will decline to answer it.

Q. The Fletcher Manufacturing Company of Providence? A. I will decline to answer it.

Q. The Atlas Tack Company of Taunton? A. I will decline to answer it.

Q. The Union Railroad Company at Providence? A. I will decline to answer it.

Q. The Masonic Temple at Boston. A. I will decline to answer.

Q. The Lyman Mills of Holyoke? A. I will decline to answer.

Q. Or any of the companies about which you testified in your direct examination? A. I will decline to answer that.

Q. In what capacity are you carried on the payroll of the Westinghouse concern? A. At present as a salesman and an engineer.

Q. In both capacities, are you named on the payroll? A. I never have seen the payroll.

Q. Then if you don't know, you can say so. I ask you now, are you carried on the payroll of the Westinghouse Company under any other name than as a salesman? A. I don't know.

Q. What central electric station have you ever planned that has been built in accordance with any plan of yours? A. No complete plant, in accordance with a plan of mine.

Q. I am asking you now with reference to a central electric station. What central electric station have you ever planned that has been built in accordance with your plans? A. I endeavored to answer the question, and I think I did.

Q. I submit you did not.

Mr. MATTHEWS. I think if you will read it over you will find that he did.

Mr. BROOKS. I say it is not responsive to my question.

The CHAIRMAN. I think it is in a measure. Go on.

Q. What central electric station have you ever planned that has been built in accordance with the plans that you have made?

A. None, complete.

Q. What central electric station did you ever superintend the erection of? A. None, complete.

Q. Well, what part? What central electric stations have you ever superintended the erection of in part? Give me the names.

A. Well, that word "superintended" misleads me somewhat.

Q. It does. Then I will run back. A. Well, I will answer if you will give me a chance. I am merely making my answer explanatory.

Q. Well, I don't want any explanation. A. You do not; all right.

Q. At present I would like an answer. Take your time. A. (To the stenographer.) Please read the question.

(The question was read by the stenographer, as follows: "Well, what part? What central electric stations have you ever superintended the erection of in part? Give me the names.")

A. I have had general charge of the erection of parts of the Montgomery street power station, the power station of the Montgomery street line, in Jersey City; of two different stations of the railroads in the vicinity of Pittsburg; I think one was the Turtle Creek & Wilmerding line.

Q. Of course you understand I am confining myself to central electric stations. A. This is simply electric stations; railroad, light and power.

Q. Yes, you are right. A. And of parts of the central electric station of the Silver Springs Bleaching & Dyeing Works—or cross that out. Of the Narragansett Electric Lighting Company, of the Braintree municipal plant, of the Westerly Electric Light Company, Rhode Island; of the People's Tramway Company in Connecticut, of the Union Railroad Company at Providence, of the Brockton Street Railway, Lakeville station. Those are all I recall now.

Q. Do you say you were superintendent of the erection of parts of the stations that you have mentioned? A. I said I had general charge.

Q. I ask you if you say now that you were the superintendent of the erection of the parts of any of those stations, and that was my original question. A. Yes, I was.

Q. On the ground? A. On the ground.

Q. There, superintending. How many of these stations were you superintendent of the erection of parts of? All that you have just named? A. Not all, no.

Q. How many? A. Three, I believe, on the ground.

Q. Did you receive from the companies compensation for your services as superintendent? A. As superintendent?

Q. That is my question. Did you receive at either of these three companies compensation for your superintendence? A. Not directly, no.

Q. Do you say that you were superintendent of any part of the erection of the Narragansett Electric Light Company's plant? A. I have not said so.

Q. Do you say that you had direction of the erection? A. I do.

Q. Of the Narragansett Electric Light Company's central station? A. Of parts of it.

Q. I mean of parts of it. Who was the head of the Narragansett Electric Light Company? Who was their head engineer? A. Mr. W. C. Woodward, I believe.

Q. What buildings of any electric light plant did you ever superintend the erection of? A. None.

Q. What boilers or engines that have been installed in any electric light plant did you superintend the installation of? A. I cannot recall having superintended the installation of any.

Q. Do you recall any now? A. I said I cannot.

Q. What electric generators, save those sold by the Westinghouse Company, have you ever superintended the installation of? A. I recall, seven or eight years ago, eight or nine years ago, when I was employed as a superintendent of erection of generators, installing several such machines in and about Pittsburg.

Q. In central stations? A. Yes, in central stations. I also recall having charge of such an installation at Jersey City. That sort of work I was engaged in, as I say, eight or nine years ago. Since that time my work of that nature, which I have had charge of, has been done by men under me, and I have not since that

time personally superintended on the ground the installation of any generators, except by occasional visits to see that the work was properly done.

Q. That is, as I understand you, since your connection with the Westinghouse Company you have not superintended the installation of any generators? A. No, I do not understand so at all.

Q. I mean, of course, any other generators than the Westinghouse generators? A. I do not recall any at the present time.

Q. Have you ever been connected in any official or compensated position with a plant using the so-called Edison 3-wire system, direct current? A. Not so far as I recall.

Q. This 2-phase system that is depicted on your diagram 6 is the one that is promoted by the Westinghouse Company, is it not? A. It is not.

Q. Is it the one that is sold specially by them? A. It is not.

Q. By whom else is it promoted or sold than the Westinghouse Company? A. By a considerable number of manufacturers. Among others—

Q. Who beside the Westinghouse Company? A. Among others, the General Electric Company, the Stanley Company of Pittsfield. Those I recall at the present moment.

Q. Do you recall any others? A. It is built and installed by one or more concerns, manufacturing abroad.

Q. Isn't it most largely sold by the Westinghouse Company? A. I am not familiar with the amounts of the sales of the other companies; I cannot say.

Q. You haven't any opinion formed about it? A. You ask me if I have an opinion formed?

Q. Yes. A. Yes. My opinion is that of the American manufacturers the Westinghouse Company sells more alternating current apparatus in general than any of its competitors.

Q. Sells more than all its competitors, doesn't it? A. Well, I haven't enough data to express an opinion on that.

Q. I understand you to say that you were referee in one or two fire losses, one of a car barn of the Consolidated Street Railway at Portland. That is, you were one of three arbitrators, weren't you? A. I was a referee.

Q. You were one of three, weren't you? A. Well—

Q. Then perhaps I will run along with you. You were one of three arbitrators, one of whom was chosen by the insurance company, one of whom was chosen by the assured, and the third one chosen by the two thus chosen? A. That is correct.

Q. You say the General Electric Company make the 2-phase apparatus, I understand you? A. Yes.

Q. Do you know what proportion of the entire sales consist of the 2-phase apparatus? A. Oh, I don't know.

Q. Have you got any opinion formed with reference to it? A. I have not.

Q. Do you know whether or not the General Electric Company advise against the use of this 2-phase system? A. I understand they have frequently done so, just as I have. I have frequently done so.

Q. And they have advised in favor of the other system, you understand, don't you? A. What other system?

Q. The 3-phase system. A. There are a lot of other systems.

Q. Do you know that the General Electric Company advise against the 2-phase system and in favor of the 3-phase alternating system? A. Their engineers do so when in their judgment the use of the 3-phase system is better, just as I do, and every other electrical engineer.

Q. Do you know of any instance where the engineers of the General Electric Company have ever advised in favor of the 2-phase system? A. Yes, sir, I do.

Q. For street arc lighting? A. For a central station.

Q. For street arc lighting? A. A central station does street arc lighting.

Q. Have you ever known an instance where an engineer of the General Electric Company has ever advised in favor of your system for street arc lighting? A. They generally advise—

Q. Just answer my question. A. They are competitors. If you mean by my system the Westinghouse Company's system, they do not generally advise people to buy the Westinghouse Company's apparatus.

Q. That is it exactly. You are competitors of the General Electric Company, are you? A. I am not. I am employed by a competitor.

Q. And is the competition brisk in southern New England?
A. I sometimes consider it pretty brisk, yes.

Q. That is, it comes down to this. There is a question, isn't there, among engineers, as to which is the better system? A. There is no question among well informed engineers, so far as I know.

Q. Well, there is a question, isn't there? That is, there is no well informed engineer, in your opinion, that doesn't adopt and advise your system? A. Oh, that is going too far.

Mr. GREEN. That isn't what he said.

Mr. BROOKS. He understands very well what I mean.

Mr. GREEN. We do not.

Mr. BROOKS. Well, you are not compelled to answer it.

The WITNESS. I am willing to answer the question that has been asked.

Mr. BROOKS. Well, let it go.

Mr. MATTHEWS. I would like to know what the question means and what the answer means.

Mr. GREEN. We have the right to know, I presume, what is meant by a question—I presume we have.

Mr. BROOKS. The witness knew.

Mr. GREEN. The witness is asked a question based on the Westinghouse 2-phase system. Now another is asked. I think we have the right to know if the question means the 2-phase system—it was based on the Westinghouse 2-phase system.

The WITNESS. There is no such thing as a Westinghouse 2-phase system.

Mr. GREEN. Well, the Westinghouse machine as made.

Mr. BROOKS. It is what we call the Westinghouse 2-phase system here, among ourselves.

By Mr. BROOKS.

Q. How much of the direct current apparatus used by central stations for lighting is of the Westinghouse manufacture? A. I do not know.

Q. Can you give me your opinion of the per cent.? A. I cannot.

Q. Is it five? A. I do not know.

Q. Mr. Warner, you spoke of the Narragansett Electric Light Company at Providence, the United Electric Light Company of

Springfield, and the Hartford Company. Is it within your knowledge that each of these companies has and had electrical engineers of their own? A. The term "electrical engineer" is used to cover a multitude of sins.

Q. I think you are right about that; I agree with you thoroughly. A. I am sure about it.

Mr. GOULDING. A multitude of sinners.

The WITNESS. That might be so, too.

Q. We won't split hairs on that; I don't ask you with reference to what your opinion of their competency is in the choice of systems. But I ask you if these three companies that I have already mentioned, do not have and did not have electrical engineers in their own employ? A. Those three companies had men in their employ who pass as electrical engineers or are electrical engineers—

Q. Well, you have answered my question. "Who pass as or are electrical engineers." Now do you say that you have given advice to the officers of the Hartford Electric Light Company in regard to the proper system to adopt or the size or kinds of units to purchase, or the general design and construction of their plant? A. I do not recall having said so.

Q. Did you in fact? A. Why, I have frequently had discussions of questions of that nature with the officers of that company and their engineer. Whether you may say that I advised them to do this or that I cannot now recall.

Q. Did that occur—your discussions—when you were endeavoring to make sales of the Westinghouse mechanisms to them? A. I cannot now recall. I have been to Hartford a great many times, and I—

Q. Well, if you cannot tell me, don't run on. A. If you will allow me to finish my answer.

Q. You have answered my question. A. I am trying to answer it.

Q. You have answered it. A. I beg your pardon; I have not finished it. (To the stenographer.) Will you read the answer as far as I had gone?

(The stenographer read as follows :

"A. I cannot now recall. I have been to Hartford a great many times, and I"—)

A. I have been there a great many times when I have not gone there for the purpose of selling the Hartford Electric Light Company anything. Frequently I have while there seen the officers of that company or some of them or their engineer, and discussed questions pending. You could hardly say that I had been there for the purpose of selling them at such times.

Q. That is, you went there to see if they needed anything—if you could make a sale to them? A. Oh, no, not necessarily. I have been there for other business and dropped in there to see them and talked with them, to see if anything was going on.

Q. In a philanthropic way, or as a salesman? A. Partially so; partially because they are very pleasant gentlemen and I like to see them.

Q. The discussions that you had arose with reference to the sales that you desired to make or had made or were making, did they not? A. Not altogether, as I recall.

Q. How much did the Hartford Electric Light Company ever purchase through you? A. Through me?

Q. Yes. A. It is some time since I handled personally their business. I cannot recall the exact amount of their purchases through me.

Q. Approximately? A. Directly or indirectly, or make even an approximation of it. I should say—

Q. Then you have answered me; you cannot tell me— A. I am not through; I should say—

Mr. BROOKS. I submit, may it please your Honors, that I am not bound to take a long disquisition here.

Mr. GREEN. He is going to try to tell you.

Mr. BROOKS. He has said he could not tell definitely or approximately.

The CHAIRMAN. I had not understood there had been any long disquisitions in this case.

Mr. BROOKS. Well, there have been, from all sources.

The CHAIRMAN. Unfortunately I was consulting with Brother Cotter about something else, and I did not hear what the witness was saying. Go on with the next question.

Mr. GREEN. But if the witness could answer the question—

Mr. BROOKS. (To the stenographer.) Just read the question, and so far as the answer has gone, the answer.

The stenographer read the last four questions and answers preceding this discussion.

Mr. GREEN. He started to give his approximation and stopped.

Mr. BROOKS. He says directly or indirectly or approximately he cannot tell.

The CHAIRMAN. No, he says he can.

Mr. BROOKS. Read the answer.

The CHAIRMAN. If you are wrong, Brother Brooks, of course you will admit it.

Mr. BROOKS. Oh, yes.

(The stenographer read:

"I cannot recall the exact amount of their purchases through me."

"Q. Approximately? A. Directly or indirectly, or make even an approximation of it. I should say"—)

Mr. BROOKS. Now I say I am right. Will your Honor acknowledge that I am right?

The CHAIRMAN. I don't know whether you are right or not. Finish your answer, Mr. Witness.

A. Why, I should say that I had handled \$20,000 or \$25,000 worth of their orders, either by going there personally and getting them or by consulting with others who went there and got them, for whom I handled them.

Q. Are you through? A. I believe I am.

Q. Who was your superior in the selling of this mechanism in Massachusetts? A. You mean in the Westinghouse Company?

Q. Yes. A. Mr. Calvert Townley.

Q. Of Boston? A. Of Boston.

Q. That is, he is at the head, if I express it correctly, of the Boston office, or the southern New England territory? A. I find it difficult to answer that question, for the reason that I have just been appointed to succeed him. I don't know whether he is it or I am, now.

Q. You don't know which is "it." Who was "it" a week ago?

A. Well, I should think probably a week ago he was—he held that position. He has been promoted since.

Q. Who will take his place you do not know? A. It has been offered to me; I think I shall take it, probably.

Q. What? A. It has been offered to me; I think I shall take it.

Q. Yes. A. In fact, I have taken it.

Q. Well, in fact you have taken it? A. Yes, in fact I have taken it.

Q. Mr. Warner, do you know of any company in New England that has available water power who does not use that water power?

Mr. MATTHEWS. Any electric light company?

Mr. BROOKS. I did not mean to confine it to that.

The WITNESS. Well, I do, yes.

Q. That is in operation? A. I am not clear as to whether you mean the water power is in operation or the company is in operation.

Q. I meant the company is in operation. I supposed if the water power was in operation, they used it. A. Yes.

Q. Do you know of any electric light company in New England—I will put it this way—

Mr. GREEN. Well, just a moment. He had answered the other question.

Mr. BROOKS. Yes, I so understand. I have a right to put another one, haven't I?

Mr. GREEN. I wanted to be sure.

Q. Do you know of any electric light company in New England that has available water power that does not use it for power purposes? A. I cannot recall any such at present.

Q. Do you know of any manufacturing concern in New England that has available developed water power that does not utilize it, assuming that the mills are in operation? A. I do not think I do know of any such company; I do not believe there is such a company, unless their mills were shut down. If they are running—

Q. I am assuming, as I understand, that the mills were in operation. A. Yes, I supposed you were.

Q. In January, 1898, what electric light companies operated their arc lights by your 2-phase system depicted here, in New England? A. I was about to answer that before you tucked on the "New England"—

Q. I will confine myself to New England in January, 1898.
A. Yes. There were some with which I am familiar outside of New England.

Q. I am talking about New England. A. As to New England—as to New England I recall that the Hartford Electric Light Company at Hartford, Connecticut, operated a 2-phase system which they used for incandescent lighting and motor work and arc lighting through secondary machines.

Q. I am asking—remember, I am confining my question to the 2-phase system that you have depicted in picture 6, and the arc light system. A. You asked me about the 2-phase system; you now ask me about the arc light system.

Q. I asked you for the 2-phase system depicted in picture 6.
A. The Hartford Electric Light Company had the 2-phase system depicted in picture 6.

Q. And the arc light system depicted in picture 6. A. They did not have the arc light system there depicted.

Q. What other companies in January, 1898? A. The United Electric Light Company at Springfield had a 2-phase system.

Q. Where? A. At Springfield; the United Electric Light Company at Springfield had a 2-phase system.

Q. The 2-phase system depicted in picture 6? A. Substantially that system.

Q. Including the arc light system? A. Not including that arc light system.

Q. Now I will ask you what company in the world had the arc light system depicted in picture 6 in January, 1898? A. I am not familiar with the whole world—

Q. Well, any that you know of. A. But I believe that in January, 1898—

Q. Well, can you answer my— A. I am going to answer if you will give me time.

Q. I do not want—

Mr. GREEN. Do you mean that he knows it by his personal inspection, or knows it as engineers know electrical facts? It must be a matter of belief unless he went and saw the plant.

Q. I am asking what city or town in the world had on January 1, 1898, the 2-phase arc light system that is depicted on picture 6?

Mr. COTTER. The better way is to name the cities, if you have any in mind.

A. I do not believe that I can answer the question any more directly than I had started to.

Q. I will ask you, did any, in January, 1898, have in operation the arc light system depicted in your picture 6? A. I do not now recall any which did,

Q. In going over the machinery, or rather, over the list of the machinery of this plant, did you have any assistance? A. Of which plant?

Q. This present plant. A. The existing plant?

Q. Yes, exactly. A. I did.

Q. Whose? A. You say in going over the machinery—

Q. No, I said in going over the list of machinery. A. Oh, the list—the list. I had the assistance of Mr. Main and his advice in relation to some matters. I had the assistance of several men with relation to particular things. For instance—

Q. I did not want to go very much into the detail of it if I could help it. I am asking you if you had assistance, and who; you have told me Mr. Main. A. I said, “for instance,” and was about—

Q. I don't care about the extent of the assistance just now; I may come to that later. A. I can say I had assistance and stop there, if you prefer.

Q. Yes. Then I asked you, whose? A. Well, I had assistance from several men. For instance, in the matter of shafting—

Q. Well, whose? A. In the matter of shafting and appurtenances I had a full list of that stuff; I made a lot of pencil sketches on the ground and took a lot of measurements, and then—

Mr. BROOKS. I submit that this is no answer to my question, may it please your Honors.

By the CHAIRMAN.

Q. He wants to know who helped you? A. Then I took that up with an engineer in Boston, who deals as a salesman—

Q. He wants to know the people, the names. A. Yes, I am going to try to get at them.

By Mr. BROOKS.

Q. Give me the names, don't go off into this world of detail.

A. I explained about that man because I cannot remember the name of the man; it is nearly three years ago.

Q. Why didn't you say you didn't remember it? You had an engineer in Boston? A. A dealer.

Q. A dealer in machinery? A. A dealer; an engineer who was a dealer in such things.

Q. Can you remember his name? A. I cannot just at this minute recall it.

The CHAIRMAN. This is just as good a time as any to let him wait and think of that name over night.

The WITNESS. I will give it to you Friday morning.

Mr. BROOKS. Do I understand you are going to put on another witness tomorrow?

Mr. GREEN. Yes, Mr. Warner has a most imperative engagement tomorrow.

(Adjourned to Thursday, Dec. 20, 1900, at 10 A.M.)

(The remainder of Mr. Warner's testimony was given at the fifty-first and fifty-second hearings, and by agreement of counsel the same is printed at this point for convenience.)

FIFTY-FIRST HEARING.

BOSTON, MASS., Friday, Dec. 21, 1900.

The Commission met at the Court House at 10 A. M.

ROBERT L. WARNER, *resumed.*

Direct examination by Mr. GREEN, continued.

Q. I have just a couple of questions which I would like to ask Mr. Warner. In the first place, Mr. Warner, in that diagram 6, whether or not there is a line there which you would desire to change? A. I observed that the draftsman who took my sketches and made these sketches here made a slight error.

Q. Go and show what the error is. A. On diagram No. 6 he got this transformer here cross phased; that is to say, he has this transformer working on one side of one phase and one side of the other phase, instead of running across here where it properly should. It will work this way all right, but technically it ought to be put up here (indicating).

Mr. GREEN. If there is no objection, I would like to have him mark the line connecting that. If you will make that line. Now, I would like to ask the stenographer to mark these various diagrams and plans of Mr. Warner.

(Six diagrams of electrical systems, produced by Mr. Warner, marked Exhibits 140 to 145 inclusive. Plan of proposed electric station, produced by Mr. Warner, marked Exhibit 146. Plan showing cross section of same marked Exhibit 147.)

Q. Your valuations that you gave, Mr. Warner, are of 1898? A. They are; yes, sir.

Q. Whether or not there has been an appreciation in the cost of materials since that time? A. There has; yes, sir.

Q. Whether or not in your opinion the plant has been depreciated since that time?

Mr. BROOKS. How is this competent?

The CHAIRMAN. Well, it certainly isn't right here.

Mr. GREEN. I asked permission of Mr. Brooks to put in some facts which I omitted.

Mr. BROOKS. I am not objecting on that ground.

The CHAIRMAN. We admit it.

Mr. BROOKS. Of course your Honors will save our rights?

The CHAIRMAN. Yes.

Mr. BROOKS. I do not know what the result may be.

The CHAIRMAN. You take the ground that it is of the first of January, 1898?

Mr. BROOKS. That is my objection.

The CHAIRMAN. Of course, if we take that ground, this evidence will become of no consequence. We admit it.

Q. What should you say of the relative depreciation of the property and the increase in the cost of materials? What effect would it have upon the value of the property, taking the two together? A. Roughly, without a long, careful computation, I should be of the opinion that one would about counter-balance the other.

By the CHAIRMAN.

Q. One about equal the other? A. Yes, sir. I think the net increase up to date — there has been an increase and a decrease in the cost of material — and the net increased cost of materials would about offset the depreciation since January, 1898.

Mr. GREEN. That is all.

The WITNESS. If the Commission is willing, I would like to say that I have thought over those questions which I declined to answer for Mr. Brooks, and if he desires to have me answer I believe I may properly answer them now.

Mr. BROOKS. I do not ask for anything just now.

Cross examination by Mr. BROOKS, continued.

Q. There was an unfinished answer at the close of Wednesday —

The CHAIRMAN. I don't remember what it was.

Q. I should like to get that.

Mr. GREEN. I suggested to the witness, who made this statement to me this morning, that he state it at the opening of the Court.

The CHAIRMAN. Well, he has done it. Let us have that answer. Do you know what the question was?

Q. Yes, it is on page 1543 of the typewritten evidence. I think it starts there, the last page of Wednesday's testimony. He testified that he had assistance, as I recall it, in the making of his valuations, and then I asked him whose, and he said, "Several men; for instance, in the matter of shafting—" Then I still continued to ask, "Well, whose?" He says, "In the matter of shafting and appurtenances I had a full list of that stuff. I made a lot of pencil sketches." The Chairman said, "He wants to know who helped you." And the witness said, "Then I took up with an engineer in Boston." The Chairman said, "He wants to know the people, the names." The witness replied, "Yes, I am going to try to get at them." Then the Chairman said, "This is just as good a time as any to let him wait and think of that name over night"; and the witness said, "I will give it to you Friday morning." Whose assistance, Mr. Warner—I will repeat the question—did you have in the making of the calculations and in obtaining the results of the various valuations? A. I had, as to shafting and kindred appurtenances, the assistance of two men in the Dodge Manufacturing Company, dealers in such supplies.

Q. What other assistance? A. In the matter of steam piping, valves, and so on, I consulted with one or two men in the firm of Braman, Dow & Co., dealers in such supplies, and I had also a number of price lists—well, that doesn't apply. I had assistance in that direction.

Q. Well, what other assistance? A. Further, in the matter of pole lines and construction and materials,—in going over the price lists which I had on those items,—I had the assistance of a Mr. Newell of Holyoke.

Q. What other assistance? A. I had the assistance of Mr. Main to an extent, I think, to which I have already testified.

Q. What other assistance? A. I cannot at this moment recall any other specific assistance which I had.

Q. You went to the plant, I think you said, in 1898? A. Yes, sir.

Q. For the first time? A. Yes, sir.

Q. Who accompanied you, if anybody? A. At one time in that year I believe I visited that plant with a party, a number of men. As I remember it, Mr. Stone, of Stone & Webster, and I believe the attorneys. I think that was the time that the whole party visited the plant. Before that I visited the plant, as I now recall it, with Mr. Callahan and a committee of the aldermen and mayor, and Mr. Frank Ridlon. I think that party first went there after telephoning to the plant.

Q. I didn't care much about the details of this.

The CHAIRMAN. The parties' names, we want.

Mr. BROOKS. I will change my question. Perhaps it was too broad.

Q. With what experts or valuers did you go to this plant?

Mr. MATTHEWS. I object. It involves the same question we have had before. "With what experts or valuers?" How does he know whether the man with him was an expert on value or not?

Mr. BROOKS. I do not know as he will, after this suggestion.

Mr. MATTHEWS. You can ask the witness with whom physically he visited the plant.

Mr. BROOKS. I am going to stick to my question, if I am permitted to.

Mr. MATTHEWS. It involves a conclusion on the part of the witness that A or B, as the case may be, is an expert on value.

Mr. BROOKS. I say, if he knows.

Mr. MATTHEWS. He doesn't know anything about it.

The CHAIRMAN. I suppose it is a mere identification of the parties, that is all.

Mr. MATTHEWS. Well, I don't know.

The CHAIRMAN. I was making this suggestion to Mr. Brooks. Aren't the names of the parties all we need?

Mr. BROOKS. I didn't care for the names of anybody except somebody who set themselves up as experts and valuers of this property, and went there for the purpose of making observations.

The CHAIRMAN. If you desire, you may ask him the names of the parties he went there with, or what they were there for, as far as he knows, if there is objection made to the form of your question.

Mr. MATTHEWS. I object to the witness assuming that anybody was retained by us as an expert on value.

Mr. BROOKS. I haven't said anything about being retained.

The CHAIRMAN. I have asked him to modify it.

Q. Mr. Warner, with whom did you go to this plant? And for what purpose did you and those who accompanied you go? A. I will endeavor to answer those two questions at once. I went, as nearly as I can recall, with the mayor, Mr. Callahan, Mr. Stone, Mr. Ridlon, Mr. Newell, Mr. Kirkpatrick. Those are the only names I can at this moment recall.

Q. Of course, my question covers all your expeditions to this plant. A. Yes, I am endeavoring to answer it in this way.

Q. So far as you know, you have given all the names that you now recall? A. I cannot recall another name.

Q. Mr. Stone is of the firm of Stone & Webster? A. He is; yes, sir.

Q. How many times did you go there with him? A. Once.

Q. And have you conferred with him since? A. I think I should say I have not.

Q. Have you talked the matter over with him — the valuation of this plant or any part of it? A. No, not the valuation, no.

Q. Or the prices? A. No, sir.

Q. Who is Mr. Ridlon? A. Mr. Ridlon is a man who lives at Boston or Brookline.

Q. What is his business? A. He is of the firm of Frank Ridlon & Co.

Q. What is his business? A. They are manufacturers of electrical supplies and dealers in electrical machinery, second hand mostly, and repairing.

Q. They chiefly deal in second hand machinery, do they not? A. My impression is that that is a smaller part of their business.

Q. All right. Now what did Stone and Ridlon go there for? What did they do?

Mr. MATTHEWS. I object.

The CHAIRMAN. Only so far as you know what they went there for. You can state what they did.

Mr. MATTHEWS. The witness can state what he saw.

The CHAIRMAN. What you saw, of course.

Q. Don't you know what they went there for?

Mr. MATTHEWS. I object.

The CHAIRMAN. I do not think it is admissible. We think he is not called upon to tell what they went for. He can state what he saw them do, what he knows about within his own knowledge.

Mr. BROOKS. Of course, I was only asking for his knowledge; but I will change it.

Q. Did you go from Boston with these two gentlemen?

A. I believe I went from Boston with Mr. Stone at the time he went.

Q. Where did you meet Mr. Ridlon? A. I believe I met him at Holyoke.

Q. Where? A. At the hotel.

Q. You met by appointment, didn't you? A. No, except so far as he had an appointment with the committee and I had one with them.

Q. You went with Mr. Stone, Mr. Ridlon, Mr. Newell, Mr. Callahan, who was then city solicitor, and a committee of the city government, down to see this plant? A. That, I think, is correct.

Q. What did these gentlemen do there, Mr. Stone and Mr. Ridlon? Look over the plant and mechanisms? A. Yes.

Q. Make a general examination? And was it an extended examination? A. Well, I should call it fairly so.

Q. Over how long a time did the examination extend? A. At that time I should think about an hour.

Q. How long a time did any of the examinations cover that you made in connection with Mr. Stone, Mr. Ridlon, or either of them? A. In connection with them, I think only about an hour.

Q. Do you know whether or not they were there at other times, either of them? A. I don't know.

Q. Have you conferred with Mr. Ridlon since, or talked with him since, with reference to the examination and the possible results of it? A. I did on one occasion.

Q. I am not asking you what you said, because I cannot put that in. A. I am not going to say.

Q. Did you on more than one occasion? A. I think not.

Q. You say this morning that you think depreciation offsets appreciation in this particular plant, as nearly as you can discover, since January, 1898? A. I am afraid you misunderstood what I intended to say.

Q. I certainly so understood you. A. I did not intend to say that. I intended —

Q. I understood you to say that the one would offset, in your opinion, the other, although you had not gone into details? A. If you understood it that way, I am afraid my answer was misleading.

Q. I will ask you the question. Does the appreciation offset the depreciation since January, 1898? A. The appreciation in the cost of materials for a new and modern plant —

Q. I do not ask for any argument about this.

The CHAIRMAN (to the witness). No. He follows the same line that Mr. Green did. He asks the question.

The WITNESS. I am afraid I cannot answer that question.

Q. Haven't you already? I understood you to say this morning that you thought the appreciation in material offset the depreciation since January, 1898, in that particular plant?

The CHAIRMAN. I understood him to say that substantially.

A. I did not so understand the question, and I don't think I can answer that question directly.

Q. Then let it go at that. I want to ask you if the cost of material has not doubled in many instances, electrical material, since January, 1898? A. I don't know of any electrical material which has doubled in cost since that time.

Q. I mean, by material, as well the furnishings and the machinery and mechanisms, as the copper and lines, and so on.

A. I do not think that any of it has. I can think of no single item which has.

Q. It has increased more than 50 per cent. in some instances, has it not? A. In some instances it has.

Q. The Springfield, Hartford, and Windsor Locks Electrical Companies use water power during a considerable portion of the year, do they not? A. They do; yes, sir.

Q. And by the word "do" I mean in the past, in 1898 as well as the present time? A. Yes, sir.

Q. And they have a sufficient water power during a large portion of the year for the performance of the service?

Mr. GREEN. What company is this?

Mr. BROOKS. Windsor Locks, Hartford, and Springfield.

Mr. GREEN. Street railway companies?

Mr. BROOKS. No, sir; electric light companies. He testified the other day with reference to these three companies.

(The preceding question, "And they have a sufficient water power during a large portion of the year for the performance of the service," was read by the stenographer.)

Mr. BROOKS. Make that, of all their service.

A. I believe that is so.

Q. And each of them have auxiliary steam plants to run when there is a scarcity of water power, do they not? A. They do.

Q. And the two larger companies, Hartford and Springfield, have doubled their water power development during the past two years, haven't they? A. I don't know.

Q. Have they increased it very materially? A. I believe they have.

Q. And do you know whether or not the Hartford Electric Light Company, owing to the distance of its power from the central station, carries steam in its boilers all the time? A. I don't know.

Q. In order to insure continuity of service? A. I think they do, but I cannot be sure.

Q. Did this People's Tramway Company, of Danielson, Conn., purchase their apparatus of the Westinghouse Company? A. Most of it they did.

Q. And through you? A. A part of it through me.

Q. A large part of it through you? A. A majority of it.

Q. You say you took your hydraulic construction values from Mr. Main, as I understand you? A. I believe so; yes, sir.

Q. Is there any doubt about it? A. I took the estimates of contract costs from him.

Q. Didn't you take the hydraulic construction values from Mr. Main? I was trying to put one general question.

Mr. GREEN. He is telling you—he took the contract cost.

Mr. BROOKS. If he can answer me yes or no, I think it will help me, because it might save more questions.

The CHAIRMAN. I think you had better do so, Mr. Witness, if you can.

The WITNESS. I am afraid that I will be slightly misleading if I say yes or no. I took them partially from him, not wholly.

Q. Didn't you take them almost entirely from Mr. Main? A. Yes, I think I did, largely.

Q. Well, almost entirely, did you not? With the exception of contingent expenses and depreciation, you took it all from Mr. Main, didn't you? A. That is the point I had in

mind. With that exception and with the exception of item 2 under "Wheels," etc., I think it did all come from him.

Q. From whom did you get shafting, coupling boxes, etc., in tunnels, section 2 under "Wheels"? A. That I got by the use of a list and sketches I have, and in conference with the men in the Dodge Manufacturing Company.

Q. That is, as I understand it, before you made up your schedule and came to your determination of the cost of values, you consulted, made inquiries, of various men who were engaged in the business? A. Yes, sir.

Q. And as the result of such information the details of your schedule was prepared? A. Many of the details, yes.

Q. Would it be improper for me to assume that almost entirely? A. I am afraid that it would. Many of the details of the schedule were within my own knowledge.

Q. I am talking now with reference to valuations and cost. A. Of the whole schedules?

Q. Yes, generally. A. Well, I took much of the details of valuation and cost from my own knowledge and experience,— my own data.

Q. How much of the schedule, in prices and values and cost, is your own, and how much was placed in your schedule after consultation or inquiries with people in the business? Can you separate it? A. Briefly, I think I can. With reference to the electrical work, electrical apparatus, that is almost entirely taken from information which I had in mind or in the form of price lists or memoranda.

Q. Very properly. A. With that exception it is largely taken from inquiries. With those exceptions the information is largely obtained from inquiries.

Q. Now, the details of your valuation of the hydraulic plant you obtained from Mr. Main? A. I did with the exception named.

Q. That is, with the exception of contingent expense and depreciation, and the shafting and coupling boxes in tunnels? A. Yes.

Q. And the item in section 2 under "Wheels" was taken from some one else, as I understand? A. Yes.

Q. You obtained the valuations, then, with the exceptions named, in detail from Mr. Main? A. Yes.

Q. Will you show me that detail?

Mr. GREEN. What do you mean by "detail"?

Mr. BROOKS. Just what I say,—detail, valuation.

A. Well, I may have misunderstood you. I took the figures, for instance, on page 2—, for instance, the figures \$6,165.90—

Q. Well, you took those figures, you say, from Mr. Main with perhaps three exceptions? A. Yes.

Q. Which you have already named? A. Yes.

Q. Didn't you have any details for those figures? A. No.

Q. Didn't you ask for any details or see any details that went to make up the totals that are comprehended in the figure column on page 2? A. I believe I did not.

Q. What? A. I believe I did not.

Q. What steam plants have you managed or operated yourself? A. I operated,—or there was operated by me and under my direction for a couple of weeks,—the plant of the Scranton Electric Illuminating Company on a long test which I made there of the whole plant. I operated personally the steam plant in the testing room of the old Garrison Alley factory of the Westinghouse Company. Those are the only distinct plants which were operated under my personal supervision, as far as I recall.

Q. When you were at Scranton, you were a student? A. Yes.

Q. And you were having an engine operated for some purpose of your own? A. The whole plant.

Q. For obtaining information of your own? A. The whole plant; yes, sir. Not an engine. There were five engines.

Q. You were not employed by the Company? A. I was not.

Q. And the Westinghouse Company,—you were in their employ when under your supervision any operation of engines was made? A. I was.

Q. Those were made for simply engine tests? A. No.

Q. Boiler tests? A. No.

Q. What were they made for? A. I operated a great many engine tests in the Westinghouse machine shop, but I hardly consider that operating a steam plant under my supervision.

Q. I understand that. A. I operated an engine in the Westinghouse Machine Company's shop in the testing room, driving a shaft on which electrical apparatus was tested.

Q. How long did you do that? A. For a number of months. I had one shift under my charge.

Q. You did not superintend those operations for the purpose of obtaining any coal consumption tests? A. No.

Q. How long ago was the last operation by you of any engine or superintendence of an operation by you of any engine? How many years ago? A. I think I have not personally, individually, had charge of any operation of an engine or engines since that time.

Q. And that was several years ago? A. 1893; 1892 or 1893.

Q. Now, the plan of your ideal plant was drawn by somebody? A. It was.

Q. Other than yourself? A. It was.

Q. By whom? A. It was drawn from pencil —

Q. By whom, I asked you? A. Oh, by Sheaff & Jaastad.

Q. You were about to say, perhaps — A. The finished drawings were made by Sheaff & Jaastad.

Q. Of Boston? A. Yes, sir.

Q. And by Mr. Jaastad was the drawing made? A. Why, no —

Q. Well, very well. You say that you furnished the pencil sketches which resulted in this drawing? A. Yes.

Q. Where are those? A. I don't know.

Q. Will you produce them? A. I will be glad to if I can find them.

Q. Where did you last see them? A. These plans were

drawn some time ago. I cannot now recall whether I left them with Jaastad or whether I received them back.

Q. Have you ever made or seen made a test of water wheels to determine their efficiency in the method usually pursued by hydraulic engineers? A. I cannot recall having done so. I think not.

Q. What is the test, as you understand it, of water wheels to obtain their efficiency usually pursued by hydraulic engineers? A. Such tests are rare—

Q. I did not ask you about their rarity. A. The test—usually no test is made. Such tests as—

Mr. BROOKS. I submit, may it please your Honors, that that be stricken out.

By the CHAIRMAN.

Q. What are the tests that are applied to the water wheel, if you happen to know? A. I was trying to come at it directly.

By Mr. BROOKS.

Q. I would like to have you come at it directly. A. The test is to determine the natural power in horse power reduced from foot pounds per second in falling water applied to the wheel, and to determine the mechanical power delivered from the shaft of the wheel. The ratio of those two determines the efficiency.

Q. Is that all, as you understand it, that constitutes the tests usually applied by hydraulic engineers for determining the efficiency of a water wheel? A. That is substantially all.

Q. What measurements are taken, if any, as you understand it? A. As I understand it, the measurements taken are weight of water applied to the wheel and the net head, including direct head and draft under which the wheel works during the test.

Q. You say weight. Were you going to say something more? A. The further measurement is a Prony brake measurement of the power delivered from the wheel shaft.

Q. How do you get at the weight of the water? A. You meter the water and determine the amount in gallons or some other measure from which you can compute its weight.

Q. You say they meter it? A. Meter it, I think.

Q. This is a test, as you suppose it? A. Yes, sir.

Q. Which you have never seen actually applied? A. I think I never have seen one. They are very rare.

Q. We will leave that there. Mr. Warner, what is the difference, as you understand it, between the every-day commercial conditions and the dress parade test conditions, if I may so express it, of engines and boilers as bearing upon the operation of a steam plant? A. The difference may be a difference in the character and variability of the load. That would be a very serious difference.

Q. You would say, would you not, substantially, that a test made to-day or to-morrow for the purpose of discovering the efficiency of a steam apparatus would be hardly the test that would be employed commercially over a series of weeks or months? A. If a test made to-day or to-morrow found a range of loads from no load to overload, and if calorimeter determinations of the quality of the steam were made, I think it would be possible to determine to-day or to-morrow pretty closely the efficiency of that engine under various loads some weeks hence.

Q. Perhaps we are misapprehending each other. Go ahead with your answer. I do not mean to interrupt that. A. I think I am fairly through with it.

Q. The test of a long space of time in actual operation under commercial conditions is not the test, is it, that is a so-called dress parade test made for one day or two days? A. No, it is not.

Q. Do you know from any tests which you have made the coal consumption under ordinary commercial conditions per horse power per hour with steady mill loads for various kinds of steam plants of various sizes? A. No, not from personal tests.

Q. I didn't catch the answer. A. No, not from personal tests.

Q. Or from personal observation of tests? A. Only within very narrow limits.

Q. How many tests, if any, of engines and boilers commercially run in mills or electric light stations have you ever made to determine the steam power cost per horse power? A. Why, commercially, two only, I think. I only saw two.

Q. Were those the two that you spoke of a little while ago, the one at Scranton when you were a student and the other one— A. I comprehended in that the Scranton test and the test of the Niagara Street station of the Buffalo Street Railway. I assisted in that test, but did not have general personal supervision of it.

Q. For the purpose of determining the steam power cost per horse power for a year? A. No, not for that exact purpose.

Q. Now, my question was, How many plants operating mills or electric stations have you made tests of for the purpose of determining the steam power cost per horse power?

Mr. GREEN. May I ask to have that question read?

(The question was read by the stenographer.)

A. I think I should say none.

Q. That is it? You yourself know nothing with reference to the market value of water power in the city of Holyoke?

A. I know something concerning it.

Q. Do you know what the value in the market, the selling price in the market is, or the rental price is, of the water power of the Holyoke Water Power Company in the city of Holyoke? A. I have only on that subject such general information as I have gained in this case and the knowledge that the Holyoke Water Power Company has for rental a considerable amount of space in the Cabot Street Mill with power supplied at a limiting price of \$30 a horse power per year, which was not taken.

Q. Is that the only thing that you know with reference to the value of water power in the market in Holyoke? A. I think I should say that it is.

Q. In your valuation that you have made in your schedule

of the plant as run by water compared with its value when run by steam, you have simply arrived at your conclusions from a comparison of the cost of the operation by each as given in your schedule? A. Yes, sir.

Q. Did those figures come from Mr. Main in whole or in part?

Mr. MATTHEWS. What figures, Mr. Brooks?

Mr. BROOKS. The ones which I just asked for.

Mr. MATTHEWS. Which were they?

Mr. BROOKS. The figures by which he compared water power and steam power in the various combinations that he has used.

Mr. MATTHEWS. The cost of operation?

A. I cannot recall that they did, except in so far as the element of fixed charges comes from a consideration of the costs of the physical plant as received from him.

Q. From whom did you obtain your coal consumption?

A. I obtained it partially from the builders of those engines.

Q. From what? A. From the builders of those engines.

Q. Well, who do you understand were the builders? A. The American Wheelock Engine Company.

Q. And from whom else did you obtain your figures? A. I obtained the figures of evaporation partially from consultation of reports of various tests which I have of such boilers, partially by inquiring relative to that from a builder of such boilers, Manning boilers.

Q. Didn't you obtain any information from Mr. Main?

A. On that subject none whatever, so far as I recall.

Q. That is, with reference to the coal consumption? A. With reference to the coal consumption.

Q. In these various combinations that you have used here of steam power and water power and steam and water power for the purpose by comparison of forming an opinion of the value of the plant under the various processes, what figures are your own and the result of your own thought, and yours only?

Mr. GREEN. Just a minute. (To the stenographer.) Will you read that question?

(The question was read by the stenographer.)

A. The figures are all my own to the extent that I used engineering pocket books and reports of tests, and data of that nature, which I have in my library. I think I may fairly say that the figures were my own.

Q. That has not answered my question yet. A. I intended it for an answer.

Mr. BROOKS. (To the stenographer.) Just read him the question again.

The CHAIRMAN. Now, does not that answer cover the question?

Mr. BROOKS. What?

The CHAIRMAN. Does not that answer cover it?

Mr. BROOKS. I do not see how it does. He says the figures are his own, but that is not all my question.

The CHAIRMAN. Cannot you address to him another question?

Mr. BROOKS. I had just as soon, of course.

Q. How many of these figures are the results of your own thought and experience, and yours only, and what part of them are the result of information that you have obtained from others? A. I cannot answer that question.

Q. You cannot separate them? A. No.

Q. And can you tell me what part of these combinations contained in your schedule are the result of Mr. Main's judgment, and what are not? A. I think none of them.

Q. Do you mean by that — I understood you to say that the fixed charges were? A. Well, of course, I tried to give a direct, short answer. I presume —

Q. Well, the fixed charges are? A. The fixed charges are based —

Q. Well, they are Mr. Main's figures, aren't they?

Mr. GREEN. Let him finish his answer, Mr. Brooks.

The WITNESS. They are not.

By Mr. MATTHEWS.

Q. Won't you finish the sentence that you began, and stopped with the word "based"? A. The figures are based on primary costs derived from him, the fixed charge figures.

By Mr. BROOKS.

Q. Did he give that to you in detail? A. Only so far as I have shown.

Q. On your schedule? A. Yes, sir.

Q. Would you say, Mr. Warner, that a mill power was more valuable in the centre of Holyoke than on the outskirts?

A. I should think it would be likely to be more valuable.

Q. And do you say that in your opinion the production cost of steam is what determines the market value of water power? A. That is my opinion.

Q. Is it a fact that power sells for more in the market usually than it costs? A. Well, I think in the majority of cases it does.

Q. Well, it sells for a good deal more, doesn't it? A. Sometimes.

Q. It depends somewhat upon the community and upon the demand? A. Yes, somewhat.

Q. Very largely, doesn't it? A. Partially. More largely —

Mr. BROOKS. (To the stenographer.) Now, just read the question and the answer.

Mr. GREEN. I don't think he had finished his answer.

Mr. BROOKS. I am going to give him the opportunity. I only wanted to see —

Mr. GREEN. Perhaps he has, I don't know.

Mr. BROOKS. I don't care to have anything answered except what my question calls for.

The WITNESS. Cross out "more largely" to save time. I said "partially." Just cross out the "more largely."

Q. Do you know of any concern selling or renting water in the market that does not get very much for the water in excess of the cost to the concern? A. I think I do.

Q. In New England? A. I think I know of no such concern in New England.

Q. Now, is that equally true of steam power, that the producer who sells power generated by steam gets usually very considerably more than the cost of the generation? A. He certainly endeavors to.

Q. Always does, so far as you know? A. He always tries to.

Q. Well, do you know of any instance where it does not occur? A. I think I do.

Q. In New England? A. Yes.

Q. Where? I will put my question this way: Where in New England do you know of a concern that is selling power generated by steam that does not make a profit over the cost?

A. I believe some of the companies in the State lose money on their power business.

Q. Do you know of any such company of your own knowledge?

The CHAIRMAN. Is not this a matter of common knowledge, Mr. Brooks, that we must take into consideration?

Mr. BROOKS. If your Honors will say so, I will stop right here.

Mr. GOULDING. We claim that the witness's evidence is uncommon knowledge, so that we have a right to cross examine on that.

The CHAIRMAN. Go ahead, then.

Mr. BROOKS. If you gentlemen will say to me it is common knowledge —

The CHAIRMAN. It is common knowledge that people who undertake to sell steam power get a profit.

Mr. BROOKS. I claim not only that they undertake it, but that they accomplish it. Now, if your Honors will say that the accomplishment is common knowledge, I will stop right there.

Mr. MATTHEWS. We will admit it.

Mr. BROOKS. Admit what?

Mr. MATTHEWS. That.

Mr. GREEN. We admit that they always try to.

Mr. BROOKS. I am not asking that. That is not my ques-

tion. You see they go to work and tie a "string" to it. They have got a "string" tied to their admissions every time.

Mr. GREEN. I understood that was what the question was.

Mr. BROOKS. No, it was not any such question. I never asked him any such question.

Mr. MATTHEWS. He has already told you all he can.

Mr. BROOKS. How do you know he has, my friend?

The CHAIRMAN. (To the witness.) Answer the question. You say there are some that you know of. Now, the question was, Who are they?

Q. My question was, What concerns selling power generated by steam in New England on the market do not obtain more than the cost of that power, as the result of your own knowledge? A. I cannot give you specific cases.

Q. And you agree, don't you, that water power in a rural community is less valuable usually in the market than water power in a city? A. I cannot agree to that.

Q. You will not agree to that? A. No.

The CHAIRMAN. What was that question? I was talking with Mr. Turner at the moment, and did not hear it.

Mr. BROOKS. You will not agree that water power in a rural community is usually less valuable on the market than water power in a city.

Q. Supposing, Mr. Warner, a 10 hour steam power costs \$30 a year — A. I didn't get that.

Q. Supposing a 10 hour steam power costs \$30 per year per horse power to produce, what do you say its value upon the market is for sale, if you can tell me? If you cannot, I will let it go. A. That is a question which cannot be answered without consideration of all the elements which enter into its cost, and what its cost means.

Q. Well, you say you don't care to answer that at the present time? A. I would be glad to answer it if I could. I think I can.

Q. Well, do you know of any sales of water power in Massachusetts within the last five years? A. The Bircham-Bend Power Company —

Q. That is the one near Springfield? A. Yes,—bought a dam and flowage rights last year.

Q. Is that an answer to my question, quite, that you are giving me now? (To the stenographer) Read him that question.

(The question, "Well, do you know of any sales of water power in Massachusetts within the last five years?" was read by the stenographer.)

Q. Now, I am asking you for the instance of a sale in the market of water power in Massachusetts in five years.

The CHAIRMAN. Within your own knowledge, I suppose?

A. It is within my knowledge what the Bircham-Bend Power Company did.

Q. Is that the only instance that you know of, an instance of the sale of water power in Massachusetts in five years? A. It is the only one I recall.

Q. Have you made any study of the flow of streams in New England and of the water shed of this particular Holyoke Water Power Company?

Mr. GREEN. Now, just a moment. It seems to me, Mr. Brooks, that you get too many questions into that, study of the streams of New England, the flow of the water shed of this particular stream,—it seems to me as if they could be separated.

The CHAIRMAN. It is not claimed, I suppose, that this witness appears here as an expert on water power?

Mr. BROOKS. That was the question in our own minds, may it please your Honors. If your Honors will say that he is not an expert on water power and that you will not consider his testimony in that connection, why, I will stop this line of inquiry.

The CHAIRMAN. We have already ruled he was not on the market value.

Mr. MATTHEWS. On the market value of water power at large?

The CHAIRMAN. On water power.

Mr. MATTHEWS. On the value of water power at large in Holyoke for any purpose?

The CHAIRMAN. Yes.

Mr. MATTHEWS. We have not offered him as a witness on that line, but I do not understand your Honor says he is not competent to testify to the value of water power for the purpose of running a central lighting station in Holyoke?

The CHAIRMAN. I think we understand your theory. I think we understand what your position is.

Mr. MATTHEWS. What I want to be clear about is that in your Honor's statement to Mr. Brooks you did not mean to say that the witness, in the Commission's opinion, was not qualified to express an opinion upon water power for use in running a lighting station.

The CHAIRMAN. I don't know. What I understood we admitted—and, if I am wrong, I would like to be corrected—was that this witness has a right to express his opinion that the power offered there was either too large, too much, or that it was too costly. That is what I have supposed was the theory that you travelled on, but that he himself is not here for the purpose of determining or undertaking to give us an opinion as to the value of water power in Holyoke.

Mr. MATTHEWS. The trouble is, the expression "value of water power in Holyoke" may mean two things. I am afraid, from the best thought that I can give to the construction of this law, that this Commission has got to put a twofold value on this water power. It is possible that it may have to do so, namely: you may have to value the water power itself, considered for any purpose, its most valuable purpose; and you may also have to value it for the purpose of running an electric light plant. Now we have asked this witness to put a value upon the water power in Holyoke for the latter purpose only; but we have not confined our questions to such as would elicit simply the opinion that this water power is unsuitable to run the plant, owing to quantity or price. We have asked him to testify, and he has testified what in his opinion as an expert steam and electrical engineer is the value of this power for the purpose of running a central lighting station. We stop right there. We do not go further and ask this witness to place a value upon the water power at large; that is, we do not ask him what the value of this power would be for its most

valuable use,—that is, for any other use than running a central lighting station.

The CHAIRMAN. Now, Mr. Matthews, we do not need to discuss this at length this morning. We understand the theory: it has been discussed half a dozen times.

Mr. MATTHEWS. I know that, and I thought it was understood; but I am afraid that I do not now know whether it is understood after what your Honor has said.

The CHAIRMAN. Let us look at this. This cross examination was for the purpose of asking this witness his knowledge with reference to water power. Do you mean to say that this witness knows the market value of water power in Holyoke?

Mr. MATTHEWS. No, sir. We do not say that he does, and we have not asked him that question; but we do ask him and have asked him and he has testified to the fair market value of this water power for the purpose of running an electric light plant. That is a collateral and independent issue in this case, as we understand the law. It is our contention that we are not bound to pay anything more than its fair market value for this purpose. I thought that was understood, but I am afraid from what your Honor has said that it is not.

Mr. GOULDING. That clearly makes competent the cross examination that was being made.

Mr. MATTHEWS. We are not objecting to the cross examination.

Mr. GOULDING. Not only competent, but necessary in order to develop our idea.

Mr. MATTHEWS. We do not object to it at all.

Mr. GREEN. We do not object to it.

Mr. GOULDING. If his evidence had been that commercially, profitably, the operator of an electric plant of this kind at Holyoke could only pay so much per year for power, why, this examination that Mr. Brooks is making would perhaps not be necessary; but, when he is allowed to testify that the market value of that power for a particular purpose is so much, then we, I think, have a right to know exactly what he knows about the market value of water power for any purpose. The market value is involved in the proposition.

The CHAIRMAN. I think you are right, Mr. Goulding. I am sorry that I made this interruption.

Mr. BROOKS. That is all right enough. If your Honors would say that you do not let this testimony in upon the question of the market value of water power in Holyoke, that you do not allow his testimony to go in as testimony upon the question of the value of water power in the market of Holyoke, that will shorten my cross examination a good deal.

The CHAIRMAN. Very well,—now, just a minute. (The Commissioners consulted.) Go ahead, Mr. Brooks, on your cross examination.

Mr. BROOKS. I regret that I am undoubtedly very wearisome.

The CHAIRMAN. No, not a bit: do not be disturbed about that.

Mr. BROOKS. Well, I am not, but we feel that it is necessary to take up some little time.

The CHAIRMAN. That is all right. Go ahead.

Mr. BROOKS. Is there a particular question pending? If so, let us have that one.

(The question, "Have you made any study of the flow of streams in New England and of the water shed of this particular Holyoke Water Power Company?" was read by the stenographer.)

Q. Now, wait a minute before you answer. A. I have made a study of the flow of some streams in New England, but not the water shed of this particular company.

Q. What streams in New England have you studied? A. Practically, the Quinnebaug River.

Q. Where is that? A. In Connecticut mostly, mostly Connecticut.

Q. Is that where your Danielsonville water comes from? A. Yes.

Q. What is the area of the water shed there? A. I cannot recall.

Q. What study did you make of the water at Danielsonville? A. At the time I made that study I believe I had the information concerning the area of their water shed from

the United States Hydrographic Surveys. I certainly had information from a very large majority of all the users that there are on that stream clear to its source in Massachusetts,—or its source, rather, is in Connecticut, it flows around through a part of Massachusetts and back into Connecticut. I collected a mass of information, covering the area of ponds and the flow of the stream at various points from its source to where we used it and below.

Q. Have you finished? A. I have.

Q. What hydraulic engineer was employed on that matter?

A. None, up to the time we bought the power.

Q. That was before any development? A. Well—

Q. What hydraulic engineer was employed to develop that power to its present capacity? A. After we bought it we employed a man from Vermont. I don't recall his name.

Q. Well, it was a hydraulic engineer? A. Yes.

Q. Then you have given us all the study that you have made of water power in New England? A. I think substantially all.

Q. You, of course, then, don't know anything with reference to the fluctuations in the flow in our New England streams? A. I have formed an opinion.

Q. I am asking you if you know anything with reference to the fluctuation of the flow in our New England streams? A. "Our New England streams" covers a very broad question. I know something concerning it, a very little.

Q. Well, what are the fluctuations? A. Well, some years—

Q. If you know? A. Some years the country is wet—

Q. I agree to that. A. And the streams will flow fairly full clear through August and September. I recall that, for comparison, in 1899 there was in Southern New England an extremely dry season, and many powers failed, many wells failed for condensing purposes and feed water which had never failed before.

Q. Well, does that constitute your answer to my question as to the fluctuation? A. Not altogether.

Q. What else is there? A. I believe from what I have

learned in the last four years that the water supply in Southern New England is gradually decreasing. That is the impression I have.

Q. Is that an impression, or is it the result of any tests that you have made? A. It is the result of what experience I have testified to.

Q. That is the result of the experience that you have just testified to? A. Principally so.

Q. Is there any other experience that it is the result of than the experience that you have just testified to? A. Only the general information which I received by association with the men who own and control such powers and use them.

Q. Do you know anything about the average rainfall and the percentage of rainfall in New England? A. I believe the average rainfall is about 42 inches.

Q. What? A. I think the average rainfall is about 42 inches in one year. It may be a little less.

Q. How much of that reaches the stream? A. Reaches the stream?

Q. Any stream, any water course? What percentage of it? Do you know? A. I cannot say how much.

Q. At the different seasons of the year? A. No, I cannot say how much.

Q. Do you know the rainfall for the different seasons of the year? A. It varies.

Q. Well, do you know what the rainfall is for the different seasons of the year? A. Nobody knows. I do not.

Q. Do you know the difference between the amount of water yielded by the land and water surfaces in the water shed? A. In the water shed?

Q. Yes. A. That question is not quite clear to me.

Q. Make it a water shed. A. (To the stenographer.) Will you please read that question?

(The question, "Do you know the difference between the amount of water yielded by the land and water surfaces in a water shed?" was read by the stenographer.)

A. I know —

Q. Can you answer that yes or no? A. I do.

Q. What is it? A. The changes in the character of the surface of the country, due to the cutting of forests and the cultivation of the country, tend generally to allow the water to run off more rapidly from the country and to create a decreasing supply in dry seasons.

Q. Do you consider that an answer to the question I just put to you? A. I endeavored to give it as an answer.

Q. Does that tell me the amount or the percentage? A. I didn't know that the amount or percentage was asked for.

Mr. BROOKS. (To the stenographer.) Will you read the question then? That is just what I asked for.

The WITNESS. I will answer the question again. I will try to make it clearer if I can.

Mr. BROOKS. I want an answer to it, that is all.

(The question, "What is it?" was read by the stenographer.)

Q. My previous question was, Do you know the difference in the amount of water yielded by land and water surfaces in a water shed? That was my question. A. The question is not full enough so that I can make a concise answer.

Q. Do you say you cannot answer it? A. It cannot be answered —

Q. Do you mean to say you cannot answer it? A. I cannot answer it.

Q. Do you claim to be a hydraulic engineer? A. No, I do not.

Q. And have you ever been the steam engineer of any steam plant doing a commercial business? A. Only to the extent to which I have testified.

Q. Testified when, this morning? A. Yes.

Q. Have you ever designed the parts of a boiler or an engine which was ever constructed? A. I think not.

Q. Mr. Warner, if you were called upon by your employer, the Westinghouse Company, to purchase all the stock of a corporation that owned an electric lighting plant, what would be the main factor that would guide you in such a purchase?

Mr. MATTHEWS. Will you read the question, Mr. Stenographer?

(The question was read.)

A. There would be three factors, neither of which I could call the main factor —

Mr. MATTHEWS. Mr. Warner, just wait a moment, please. (To the stenographer) Now, will you read that question again. (The question was again read.)

Mr. MATTHEWS. We desire to object to that question.

The CHAIRMAN. What?

Mr. MATTHEWS. We desire to object to that question on the general ground which was stated in the objections we made to the evidence offered by the Company upon what we said was the value of the Company's stock, if it had any out. That is the same objection that has been made before, and which the Commission has taken under advisement. We might also object, perhaps, on the ground that there was nothing in the direct examination of the witness that leads to this.

The CHAIRMAN. That would be overruled, of course, on the general principle that the cross examination may develop. As to the former, that would be the same as before. You put it upon the same ground?

Mr. MATTHEWS. We just wish our rights saved.

Mr. BROOKS. Now, read the question.

(The question, "Mr. Warner, if you were called upon by your employer, the Westinghouse Company, to purchase all the stock of a corporation that owned an electric lighting plant, what would be the main factor that would guide you in such a purchase?" was again read.)

A. There would be three principal factors, of which I can hardly call either one the principal factor.

The CHAIRMAN. Name them. I suppose that is the question.

The WITNESS. I should consider the character and condition of the plant, the rates obtained for lighting and power, and the market for the same, the net income which the company obtained —

Q. Yes. A. — principally.

Q. And would you not consider present prospects for future business? A. There are a large number of minor things which I would consider. That would be one.

Q. Would not that be a very strong factor? A. Yes, it would.

Q. And if you found that a plant was paying a large per cent. in profits — was earning a large per cent. in profits, and it had structure enough to insure the continuance of that earning, of that income, you would say that the income or earnings would be the main feature of valuation, would you not?

Mr. GREEN. Valuation of what, the stock or the plant, Mr. Brooks?

Mr. MATTHEWS. The valuation of what, Mr. Brooks?

Mr. BROOKS. Oh, the same question —

Mr. MATTHEWS. Valuation of the stock?

Mr. BROOKS. The valuation of the company or the stock of the company.

Mr. MATTHEWS. The stock of the company?

Mr. BROOKS. I am not asking about structural valuation.

Mr. MATTHEWS. (To the stenographer.) Will you read that question?

(The question, "And if you found that a plant was paying a large per cent. in profits — was earning a large per cent. in profits, and it had structure enough to insure the continuance of that earning, of that income, you would say that the income or earnings would be the main feature of valuation, would you not?" was read by the stenographer.)

Mr. MATTHEWS. (To the stenographer.) Now read what Mr. Brooks added.

Mr. BROOKS. I don't care to have that go in. I want to have the question go in as I asked it, and have an answer to that question.

Mr. MATTHEWS. I object to your question as obscure — "valuation" — valuation of the plant?

Mr. BROOKS. My friend, I have just asked him the question, and I want to get an answer.

Mr. MATTHEWS. Counsel has used two different expressions.

Mr. BROOKS. I don't know why I should have to dot my *i*'s and cross my *t*'s every time I ask a question.

The CHAIRMAN. Evidently, Mr. Witness, he is talking about the valuation of the stock.

A. If from my examination of the physical property and of the rates and of the methods of conducting the business it were certain that the earnings shown were fairly shown, the net earnings would be the principal factor that I should take into consideration or account in fixing the value of the stock.

Q. You don't answer my question, although I don't doubt you intended to. A. I intended to.

Q. If you have structure enough to insure, so far as structure can, the continuance of the business and the income, then the present income would be the main factor in your valuation, would it not, and in arriving at your determination to purchase?

A. I can hardly say flatly yes to that, for this reason — if you wish me to state it?

Q. You see what my question was — A. If you will let me explain a little bit, I can answer yes, I think.

Q. I don't want an explanation, if I can help it: I want a direct answer if I can get it.

The CHAIRMAN. He said he could hardly answer that by a flat yes, and was going on to say why not. Perhaps you had better hear him, Mr. Brooks.

Mr. BROOKS. I don't know —

Q. Can you say yes or no to that question?

The CHAIRMAN. He said he could not.

Mr. BROOKS. I am asking him again, because if I can get a direct answer I would rather have it, and I don't mean to shut off any one from explanation; but he can explain later.

The CHAIRMAN. Very well.

A. Well, I cannot say a flat yes to that.

Q. Now, I will put it in this way to you: If your structure insures the continuance of that business, what would be the main factor in your arriving at a determination of purchase, if it was not the income derived from the plant?

Mr. MATTHEWS. I object.

The CHAIRMAN. Well, on the same ground, I understand?

Mr. MATTHEWS. No: I object to the question as assuming that the structure insures a continuance of the business.

Mr. COTTER. In cross examination he may answer it.

Mr. BROOKS. I submit my question is all right.

The WITNESS. (To the stenographer.) Will you read the question?

(The question was read by the stenographer.)

A. I should be positively obliged to consider the character and duration of the franchises, the probability of decreasing earnings due to advance in the art or competition; and, having done so, the consideration of net earnings would be the principal consideration.

Q. Perhaps you have answered that sufficiently. It would, in a general way, be the principal consideration that would lead to your arriving at a determination of what should be paid, wouldn't it? A. To the extent which I have named, it would.

Q. Mr. Warner, did you ever know of any company that was purchased upon the basis of the valuation that you have given for this case?

Mr. GREEN. What do you mean by "company"?

Mr. BROOKS. I was going to say "exploited," and I kept that back because I thought it might be improper.

Mr. MATTHEWS. Mr. Brooks, I have no doubt you intend to be perfectly plain, but is not the use of the word "company" ambiguous? Do you mean the Company's stock, or its plant, or both?

Mr. BROOKS. I should not suppose it would be ambiguous; but, if I have got to make it more clear, I will make it.

Q. Have you ever known of the business or stock of a company in Massachusetts or New England that was sold upon the basis of valuation which you have testified to in this case?

A. The two things have no reference to each other, as far as I can see. I cannot answer the question. The—

Q. Well, you say you cannot answer that? If you say you cannot answer it, I will stop.

The WITNESS. (To the stenographer.) Read it again. Perhaps I can.

The stenographer read: "Have you ever known of the business or stock of a company"—

The WITNESS. The business or stock, does it say?

The STENOGRAPHER. Yes.

A. I will answer the question. No.

Q. Did you ever know of any concern in the world that was going, that was sold upon a valuation based upon the rule laid down by you in your testimony in this case for the valuation of the electric plant of the Holyoke Water Power Company?

Mr. MATTHEWS. You say "concern." Do you mean stock?

Mr. BROOKS. I am going to stick to that question.

Mr. MATTHEWS. I object to that as ambiguous. I do not know what he means.

Mr. BROOKS. Is there any ambiguity in the mind of anybody as to what I mean?

The CHAIRMAN. Answer it, Mr. Witness. He asks you if you know of any concern —

The WITNESS. It is ambiguous to me, because I cannot in my mind consider the two things together. I am here valuing physical property. I am asked to consider stocks — everything else —

The CHAIRMAN. Mr. Witness, you are off the track.

The WITNESS. I am obscure as to —

The CHAIRMAN. Mr. Witness, you can answer the question. The question is whether you have known any concern in the world that was sold on the basis that you have testified to. That is the question.

A. I do not know of any plant which ever changed hands in this way.

Q. You mean by that "sold"? A. Sold, yes.

Q. Mr. Warner, if you were the owner of a going manufacturing concern, would you sell it upon the basis of your rule for valuation in this case? A. If I had kept my books properly, I would.

Q. Did you understand my question? A. I thought so. (To the stenographer) Will you read it?

(Question read.)

Q. You don't want that answer that you gave to stand, do you? A. Well, strike it out, strike it out. The —

Q. Now you can answer me that yes or no. I don't want any disquisition about it, and I do not mean that in any offensive sense. A. Mr. Brooks, I am going to give you the shortest answer I can to that question. I cannot answer it yes or no.

Q. You say you cannot? A. I cannot answer it yes or no. I must absolutely —

Q. Mr. Warner, I will put this question —

Mr. GREEN. Just a moment.

Mr. BROOKS. He was not answering.

The CHAIRMAN. The witness has a right to answer the question.

Mr. GREEN. He was trying to explain the difficulty.

A. I must absolutely fix my answer upon the question of whether the franchise and property and business of the Company changed hands, or only its physical assets; and I am not clear as to what your question means.

Q. I say "concern."

Mr. GREEN. I don't know what "concern" means.

Mr. BROOKS. Mr. Green, you don't know what "concern" means?

Mr. GREEN. I don't know what that "concern" means,—whether you are applying it to the plant as used here, or whether you are applying it to the business and what a person would get from a purchase of stock.

Mr. BROOKS. It all comes from my not feeling over and above well this morning.

The WITNESS. I would like to give you as short an answer as I can —

Q. I do not want to be over technical about this. Mr. Warner, if you owned the electric plant of the Holyoke Water Power Company, would you sell it upon the basis of valuation that you have laid down in this case? A. If I understand correctly the law, I would.

Q. Well, I am not asking you about the law. A. Well, I am obliged to qualify: I cannot say yes or no.

Q. If you had had this plant, and it was bringing you in an income of \$23,000 net, would you dispose of this concern for the price that you have said the City should pay for it?

Mr. MATTHEWS. Wait a moment. We object on the ground that the question assumes an earning of \$23,000.

Mr. BROOKS. I have a right to assume it in my question.

Mr. MATTHEWS. I would like to argue it. We say there is no evidence in this case, and could not be any evidence in this case, that the plant is earning any money at all. It is the corporation that owns it that is earning \$23,000, according to their figures, or \$10,000 according to ours. The Company is earning this sum of money, whether one or the other, out of the plant plus franchises and other things. It is absurd to say that the plant is earning the money.

Mr. BROOKS. Well, I would like to know —

Mr. MATTHEWS. Therefore we object to the question.

Mr. BROOKS. I will stick to it.

Mr. MATTHEWS. All right.

Mr. GOULDING. What difference does it make whether it is earning it or not with the right of my associate to assume something in his question?

Mr. MATTHEWS. I do not think he can assume anything that is not so.

The CHAIRMAN. If he assumes something that is wrong or erroneous, it does not amount to anything.

Mr. MATTHEWS. He says he assumes something.

Mr. BROOKS. I have a right to assume something.

Mr. MATTHEWS. He assumes something that is not so.

The CHAIRMAN. Then he is "busted," if it is not so.

Mr. BROOKS. I am "up the spout," if it is not true.

Mr. MATTHEWS. I understand it is a question for the Court, and not for the witness, whether the assumption made by counsel in putting a hypothetical question is true or false. It is for the Court.

The CHAIRMAN. I do not understand it is for the witness, either.

Mr. MATTHEWS. I thought you said it was.

The CHAIRMAN. But, if the assumption of counsel is erroneous, then, whether the witness answers or not, the question and answer are of no use, no value. He has assumed that the earnings amount to \$23,000.

Mr. MATTHEWS. We do not object to that assumption if your Honor please, because there is evidence tending to show that. What we object to is the assumption that the *plant* makes these earnings. It is the *Company* that makes them out of its franchises and its business and its plant,—not the plant alone. It would be just as improper for us to put this question, assuming that the franchises of the Company enable it to earn \$23,000 a year,—an assumption which is radically false.

The CHAIRMAN. If you put that question, we should let him answer it.

Mr. MATTHEWS. We should not put it, because we know it is absurd.

The CHAIRMAN. Very well. Mr. Brooks is the judge of it.

Mr. MATTHEWS. I think not. I think the Court is the judge of it.

The CHAIRMAN. My dear sir, do you mean to tell me that in the cross examination of a witness counsel may not put assumptions which may turn out to be erroneous? If they prove to be erroneous, that annihilates the question. You may put the question, Mr. Brooks.

Mr. MATTHEWS. We would like to except.

The CHAIRMAN. Very well.

The WITNESS. Kindly read the question.

Mr. BROOKS. I will change the question,—put another one,—

Mr. MATTHEWS. Are you going to put another question?

Mr. BROOKS. I am.

Mr. MATTHEWS. That is what we wanted you to do.

Mr. BROOKS. What?

Mr. MATTHEWS. Put another one.

Mr. BROOKS. I am going to put this question. I am not going to take up time to have the stenographer go back to the former volume to find what the question was.

Q. If you owned this plant, and this plant was paying you \$23,000 a year, net income, would you sell it for the price that you have specified in this schedule here?

Mr. MATTHEWS. We object.

Mr. BROOKS. I submit that can be answered yes or no.

Mr. MATTHEWS. We object for the same reasons.

The CHAIRMAN. Admitted for the same reasons.

Mr. GREEN. We except for the same reasons.

A. If I owned this plant —

Q. What? A. If I owned —

Mr. BROOKS. He can answer that question, I submit, your Honors, yes or no.

Mr. MATTHEWS. I submit, he cannot answer yes or no. Nobody can.

Mr. BROOKS. I say he can.

The WITNESS. I cannot answer it yes or no.

The CHAIRMAN. The witness says he cannot.

Mr. BROOKS. Very well, then I will stop it. I will drop it.

The CHAIRMAN. All right, that settles it.

Mr. MATTHEWS. The witness settled it.

Q. If you owned a cotton mill that was paying you a profit of 15 per cent. net, would you sell it on the basis of your rule of valuation given in your testimony in this case? A. I do not know.

Mr. MATTHEWS. Will you read that question over, Mr. Stenographer?

(Question read.)

The CHAIRMAN. The witness says, "I do not know."

Mr. BROOKS. Yes, sir, he has answered it. That settles it with me.

Q. You have not considered rates in your valuation of this plant? A. Pardon me?

Q. You have not considered rates in your valuation of this plant?

Mr. MATTHEWS. Rates?

Mr. BROOKS. Rates, rates.

Q. Don't you understand what I mean? You had already referred to it just a few moments ago. A. Oh, yes.

Q. That you would take that into consideration. I mean rates for the sale of electricity. A. I have not.

Q. Do you know, Mr. Warner, or have you any information, that electrical power generated by both steam and water is sold as high as \$100 per horse power on a 10 hours' basis in the State of Massachusetts?

Mr. GREEN. I object.

Q. I should have put in there per year, but I assumed you understood what I meant. A. Ten hour power for 300 days, isn't it?

Q. Yes.

Mr. GREEN. Just a moment.

Mr. MATTHEWS. Is that what you mean, Mr. Brooks, ten hour power for 300 days?

Mr. BROOKS. Certainly.

The CHAIRMAN. Do you object to that?

Mr. MATTHEWS. Yes.

Mr. GREEN. I do. I fail to see wherein the sale of electrical power in some other place than the city of Holyoke can have any bearing on the question.

The CHAIRMAN. He may have to show similar conditions later.

Mr. GREEN. We are not valuing the sale of electrical power.

Mr. MATTHEWS. There is no electrical power to be sold in this case.

Mr. BROOKS. Who says so? I say to the contrary. We say if they have too much water power, as has been their contention all through this case, that they can sell the power electrically if they choose to; and we are selling it now electrically.

The CHAIRMAN. We admit it subject to your exception, Mr. Matthews. I confess now I do not quite see why you go so far away. Let the discussion drop.

Mr. BROOKS. I am doing it for purposes of my own.

The WITNESS. Let me have a piece of paper, please. (Figuring.)

The CHAIRMAN. (After a pause.) Has the witness answered that question?

Mr. BROOKS. No, sir.

The WITNESS. I am trying to answer it.

Mr. BROOKS. I do not quite see myself —

By the CHAIRMAN.

Q. Are you taking observations? A. Yes, sir; I am taking a few. (Figuring.) I think there may be —

Mr. BROOKS. Wait a minute. Just read the question. You can answer me yes or no.

Mr. GREEN. Well, I don't know whether he can or not. I think he is to be the judge.

Mr. BROOKS. If you can.

The question was read, as follows: —

"Q. Do you know, Mr. Warner, or have you any information, that electrical power generated by both steam and water is sold as high as \$100 per horse power per year on a 10 hours' basis in the State of Massachusetts?"

A. I think there may be some small motors served at that rate.

Mr. BROOKS. I ask to have that answer stricken out.

Mr. GREEN. The question applied to information as well as to knowledge.

Mr. BROOKS. I do not know why I should be continually limited by this witness.

The question and answer were read to the Chairman.

The CHAIRMAN. The question says, "On any information received." It seems to me that the answer can stand. I don't know.

Mr. BROOKS. I don't know as it makes any special difference, except that it is continually being put in the answers to the questions. It does not seem to me it is quite fair.

The CHAIRMAN. Go ahead.

Mr. BROOKS. It is allowed to stand?

The CHAIRMAN. Yes.

By Mr. BROOKS.

Q. Do you know that six cents per kilowatt hour is a common price for power?

The CHAIRMAN. That calls for yes or no, Mr. Witness.

A. I do not know that.

Q. What? A. I do not know that.

Q. Is not that a price that is frequently asked and obtained? A. Not to my knowledge.

Q. Never have known of an instance? A. I can't recall one.

Q. What is the highest price you have known of as having been obtained for electrical power? I suppose I should put that per kilowatt hour? A. Yes.

The CHAIRMAN. This question calls for personal knowledge.

A. (After a pause.) I cannot recall—

By Mr. MATTHEWS.

Q. This is for power, is it? A. Yes, sir,—any absolute transactions of my own knowledge bearing upon that point. I—

By Mr. BROOKS.

Q. You mean by that, of your own knowledge you do not know anything about it? A. Yes, I—

Q. If you mean that— A. I do not mean that. I mean this, Mr. Brooks, that, while I am familiar and have in my possession data bearing on the power rates of a number of companies, I do not of my own knowledge know of a contract for power which I have actually seen,—certainly in New England, at any rate. I have their power rates, their power sheets. I am posted on that subject in general.

Q. That is, you cannot tell me from your own knowledge what is charged and obtained for electrical power in Massachusetts? A. Only so far as I have received the information from the managers of plants who sell it.

Q. What is the highest rate per kilowatt hour that your information covers for electrical power? A. You mean the combined water plant and steam plant in this State, preferably?

Q. I mean by any central electric light station. A. In this State or—?

Q. Exactly, in this State. A. The highest rate in this State,—power rate—3,000 hours per annum service,—of which I know, is $2\frac{1}{2}$ cents per kilowatt hour.*

Q. Where is that? I not only said “know,” but “which your information covers.” A. That is what I meant. My information covers that.

Q. Where is that? A. I derive information from the rate sheet of the United Electric Light Company of Springfield for one-horse power motors.

Q. Do you understand that that is their maximum rate in Springfield? A. That is the maximum rate of which I know or have any information,—for power,—for power, of course.

Q. Have you the rate sheet with you? A. I have a copy of it.

Q. What? A. I have a copy of it.

Q. Well, do you understand that that is their maximum rate? A. I beg your pardon. I think I should have to qualify that—

Q. Is not that the minimum rate? A. The minimum rate?

Q. Yes, sir. A. That is the maximum power rate, except for elevators.

Q. Well, I did not care— I ask you now—I repeat my question—what is the highest rate per kilowatt hour for electrical power charged in Massachusetts, so far as your information goes? A. For 3,000 hours per annum service,—that is the highest rate I know of for 3,000 hours per annum service.

Q. I did not ask you that. A. I thought you did. I beg your pardon.

Q. Well, I do not ask you that. I am asking you per hour service. A. The highest rate per hour service?

Q. Per kilowatt hour? A. Kilowatt hour. Well, Mr.

* See correction, p. 173.

Brooks, you did ask me when I started to answer this on the basis of 10-hour power for 300 days.

Mr. BROOKS. That was not my last question.

Mr. MATTHEWS. You said so, Mr. Brooks.

The WITNESS. I so understood it.

Mr. BROOKS. That was way back—that which he had answered. Now, I put my question in another way, and I am going to insist on it:—

Q. What is the highest price paid per kilowatt hour for power that your information covers? A. Irrespective of the class of service?

Q. Yes.

Mr. MATTHEWS. Irrespective of what?

The WITNESS. Irrespective of whether it is 3,000 hours or elevator or—

Mr. BROOKS. That is it exactly.

A. The highest kilowatt hour rate my information covers is for power furnished for—

Q. Give me the rate. Don't go into the details of it.

A. Well, I will give it to you. The highest my information covers is $5\frac{1}{4}$ cents per kilowatt hour.

Q. Where is that rate? A. That is the rate at Springfield for elevator motors.

Q. Have you made an examination of the Gas and Electric Light Commissioners' Reports? A. I have.

Q. With reference to the rate charged for electrical power?

A. Not with reference to the rates, no.

Q. Have you seen in the Gas Commissioners' Reports the rates obtained for electrical power in this State? A. I presume I have, but I cannot recall having seen them.

Q. You cannot now say whether, according to the Gas Commissioners' Reports, there are rates charged for electrical power considerably above the $5\frac{1}{2}$ cents per kilowatt hour that you have just spoken of? A. I do not think I can say one way or the other. I have not the information in mind. I have not seen the reports for some time.

Q. At $5\frac{1}{2}$ cents per kilowatt hour, assuming that that is

the rate, how much would that be per horse power hour? A. That would be — if my slide rule is right — 7 cents per horse power hour.

Q. What? A. That would be 7 cents per horse power hour.

Q. Well, you don't mean that, do you? A. What did you ask?

(Question read.)

A. I have got the horse power and the kilowatt hour transposed. What I should have said was this, that the Springfield rate —

Q. Wait a minute. A. I have made a mistake there in using the sliding rule.

Q. Go ahead. You want to explain something? A. Yes. Instead of answering you $5\frac{1}{4}$ cents, I should have answered you something considerably larger, Mr. Brooks.

Q. That is, you meant $5\frac{1}{4}$ cents per horse power hour instead of $5\frac{1}{4}$ cents per kilowatt hour? A. No, I did not mean that. I meant 7 cents per horse power hour, which is about equivalent to $9\frac{1}{3}$ cents per kilowatt hour. That is where I made the mistake.

Q. That would be more than \$200 per horse power per year, wouldn't it, on the basis of 3,000 hours? A. Well, that is not 3,000 hour power.

Q. Well, be just kind enough to answer my question. A. I will have to figure it out. What was the question? (Question read.) A. Seven cents per horse power hour and 3,000 hours, it would be \$210 per horse power year.

Q. It would be \$210? A. Yes, sir. I want to call your attention to the fact that I made a mistake in the other figure. It should be larger. I gave you $2\frac{1}{2}$ cents. It should have been much larger.

Q. That is, you are figuring on horse power rather than — A. I worked the thing the wrong way. I have these things here per horse power hour, and in attempting to answer your question I did it wrong. I would like to figure it.

Mr. GREEN. Will you let the witness state what means

and instrumentalities he has been using in making these calculations?

Q. Mr. Warner, you call the stenographer's attention to the particular question which you desire to correct your answer.

A. Well, he would have to go through his notes. I think it was the other stenographer, too.

Q. All right. A. A while back the question was asked me for the highest kilowatt hour rate per annum for power,—the highest rate I know of for such service in the State. I replied $2\frac{1}{2}$ cents per kilowatt hour. I should have said —

Q. I guess you have got that wrong. A. Well, maybe I have. I should have said $3\frac{1}{2}$ cents a horse power hour, which is equivalent to a little less than $4\frac{1}{2}$ cents a kilowatt hour.

The CHAIRMAN. If the witness desires to rectify his figures later, he may do so.

The WITNESS. I want Mr. Brooks to understand that I made a mistake.

The CHAIRMAN. Figuring on the stand is always embarrassing.

Mr. MATTHEWS. Mr. Brooks, will you ask him what he has been using in making his calculations?

Mr. BROOKS. You may ask him.

Mr. MATTHEWS. Mr. Witness, Mr. Brooks permits me to ask you this question —

Mr. BROOKS. Wait a minute, Mr. Matthews. I would like to have the stenographer read the question, the answer to which the witness had just corrected.

The stenographer read the question referred to, and the corrected answer, as follows:—

“Q. What is the highest rate per kilowatt hour in this State that your information covers for electrical power? A. The highest rate in this State,—power rate — 3,000 hours per annum service,—of which I know, is $3\frac{1}{2}$ cents per horse power hour, which is equivalent to a little less than $4\frac{1}{2}$ cents per kilowatt hour.”

The WITNESS. That will straighten the record out.

Q. Now, at $3\frac{1}{2}$ cents per horse power hour, it is equal to \$100 per year approximately? A. Yes, sir.

Q. On a 10 hour basis? A. Yes, sir.

Mr. GREEN. You said you would allow us to ask a question.

Mr. BROOKS. Certainly. Go ahead.

By Mr. GREEN.

Q. In the figuring which you have recently done, you made use of what instrument? A. I have been using an engineer's slide rule. In order to figure quickly I have used it, and figured wrong once. In order to follow the cross examiner I let it slide or slip.

Mr. BROOKS. That is all right. I do not think anybody is impugning him for the mistake.

Mr. GREEN. Oh, no. I simply would like to have it appear, that is all.

By Mr. BROOKS.

Q. Mr. Warner, why is it that water power is being developed and increasing in value all over the country, where there is water power? A. I do not know that it is increasing in value.

Q. I mean by that, in market value. A. Well, I do not know that that is so. It is being developed. That part of the question is undoubtedly so. It is being developed, and the reason it is being developed is that there is a theory in the business in which it is being developed, that it can be developed and made to compete with steam power.

Q. And you say that is a fallacy? A. That is a theory, and in some cases correct and in some cases wrong.

Q. Do you recall any case where it is correct, in Massachusetts? A. Well, under some of the leases at Holyoke I understand —

Q. Well, was this my question? A. I believe so. It is hard to answer specifically a wide-spreading question.

(The question was read by the stenographer: "Do you recall any case where it is correct, in Massachusetts?")

A. Well, I was trying to recall one. I think there are such cases.

Q. Do you know of any? A. I think I do.

Q. Where do you know of any such case? A. Well, Mr. Brooks, the only way I could know would be to have full knowledge of the books of the concern.

Q. I am asking for knowledge, Mr. Warner, and not for information, by my question. A. Well, no; I don't know from any such examination of any case. I believe there are such cases.

Q. You were not asked for your belief, and I ask to have that stricken out. I am asking a direct question as to your knowledge. A. Please strike it out. I have no absolute knowledge of any such case.

The CHAIRMAN. The "belief" part is struck out.

Q. Do you know of any case in Massachusetts where a concern, having water power available, has paid anybody a bonus to take it away from them? A. I must confess that I do not.

Q. I was asking this question in view of your statement of negative values, as contained in your schedule. According to the theory of your schedule, the electric light company, if it were an electric light company owning this plant, could afford to pay some hundreds of thousands of dollars to be relieved of the water power, rather than to run their concern by it. That is your theory, isn't it? A. That assumption is correct on the basis of some of the proposals made by the Company.

Q. Exactly; but I am speaking about that part of your schedule that covers this question. A. Yes, I thought you were.

Q. On your theory, as I understand it, the city of Holyoke, if they were going to take this plant and take the water power on the basis of the proposals in this case, could well afford to pay the Holyoke Water Power Company some hundreds of thousands of dollars to relieve them of the water power? Isn't that so? A. You say on the basis of the pro-

posals. It is true on the basis of some of the proposals in this case,— quite true.

Q. On the basis of 16 mill powers, with a rental of \$1,500 a year per mill power, that would be so, wouldn't it, in your opinion? A. And the \$72,000 bonus, I think it would be.

Q. That is, the \$72,000 includes the land? A. Yes, includes the land.

Q. Your capitalization would mean, wouldn't it, that the city of Holyoke could afford to give the Holyoke Water Power Company some hundreds of thousands of dollars rather than to take the water power,— rather than to be burdened with it? A. I think they could, yes. I think they would be well out of it, rather than to take it.

Q. Let us see for a moment. Although they happened to be obtaining an income of something like \$20,000 a year from the plant? A. They could obtain that income equally well by driving by steam, at a lower cost.

Q. Well, your theory is, they could obtain a good deal more income if they drove it by steam? A. I have not advanced that theory.

Q. You have in your schedules. That is what it amounts to. A. I have not discussed the question of income at all in the schedules.

Q. But you have said, haven't you, in substance, that steam would be a great saving in the operating expenses of this plant? A. As compared with some of the matters.

Q. Upon the basis that you have mentioned in your schedule? A. At \$24,000 rental, yes, steam would be a great saving.

Q. And on the other — 8 mill powers? A. Yes.

Q. And therefore it amounts to this: That, if they use steam, the income of this business would be largely increased, in your opinion, rather than to take either 8 mill powers or 16 mill powers, at the rate specified in the schedule? A. Why, the net income certainly would.

Q. That is what I mean. And you figure it out that the capitalization of the increased net income would amount to

several hundreds of thousands of dollars? A. Why, I have not so figured it out.

Q. Well, you do, don't you, in your mind? A. I have not considered that question in my mind at all. I have dealt with the question of the comparative values of the physical property, and have not taken the question of income into account.

Q. That is really what it comes to, isn't it? A. Well, that involves a study of the question of income. I cannot answer it fairly.

Q. Assuming now with me, for a moment, that that net income is \$23,000, how much would that net income be increased if you used steam alone, in your opinion? A. Well, I would be very glad to answer that question if you will give me a few hours' study of the tables to form an opinion. I cannot do it offhand.

Q. Well, it would be some thousands of dollars increase per annum, wouldn't it, in your opinion?

Mr. GREEN. On what water rent is that based?

Mr. BROOKS. Never mind. Let me ask my question. Don't suggest to the witness any other intricacies.

(The preceding question was read by the stenographer, "Assuming now with me, for a moment," etc.)

Mr. BROOKS. Then I asked another question, to prevent his going into any minute calculation, if it wouldn't be several thousands of dollars per annum.

A. That question ought to be answered in five different ways, depending on the bonus and water rental. I will assume you mean a price of \$72,000 for the land and privilege appurtenant and \$24,000 water rental.

Q. Take either \$24,000, or on the basis of 8 mill powers. A. Well, I will take one at a time.

Q. I don't ask you to go into all that.

The CHAIRMAN. G ahead, Mr. Witness.

A. On that basis of \$24,000, considering \$23,000 net income, on the two comparisons, one by steam and one by water power, I should think that net income—well, you can't

consider that net income is the same in both cases. Considering the gross income the same —

Q. I am talking about net income. A. Net income in which way?

Q. I didn't know there was but one way for net income. A. You have asked me to compare net income with two different expenses. I can't do that.

Q. But assuming it means net, means profit. A. Which way?

Q. I don't understand what you mean. A. You cannot have the same net income.

Q. I mean plus way. I don't mean any minus net income, but the plus net income.

Mr. MATTHEWS. The witness started to answer the question and was cut off unintentionally.

The CHAIRMAN. Go ahead, Mr. Witness.

The WITNESS. You have got me tangled up here. I don't know what Mr. Brooks wants to know.

Q. I will put this question to you. On the basis of 8 mill powers, at a rental of \$1,500 per annum, the net income or the net profits of this concern would be increased, in your opinion, several thousands of dollars by the use of a steam plant? If it wouldn't be, it is all right.

The CHAIRMAN. Do you understand that, Mr. Witness?

A. Yes, I think it certainly would.

Q. And, then, if you got up your ideal plant in Holyoke, why, you figure it that the profits would be very largely increased, wouldn't they? A. As compared with the water power or the steam plant?

Q. Oh, I mean the whole business. You are going to assume that you can find the spot, anchored somewhere along the river, on which you can put up your ideal structure and install your ideal machinery and run it by steam; and you figure, don't you, that the income would be tremendously increased? A. I have not so figured it.

Q. Well, would it be a fact? A. That would depend whether the existing steam and electric plant be considered as taking the structural value or an imaginary value.

Q. What has that got to do with my question? A. It has got everything to do with it.

Q. Now, I am going to put that again. You erect a plant up there that suits your ideas and is as near perfection as anything can be. Wouldn't it increase the net income tremendously?

Mr. MATTHEWS. Over what?

Mr. BROOKS. Over the present.

Mr. MATTHEWS. What? Plant? How run? You can run it in a dozen different ways.

Mr. BROOKS. The witness, I think, would understand, if you would let him.

The WITNESS. Well, I feel thoroughly competent to ask those same questions. You asked me for a new and modern plant. I was going to ask that same question.

Q. Don't you understand my question? A. I do not.

Q. Tear down this plant, throw it away, manufacture your electricity by your ideal plant and in your ideal way, suited to your notions of perfection. Wouldn't the net income be most tremendously increased? A. As compared with the operation by water power —

Q. As compared with the present income from the present plant. A. As operated by water power —

Q. Now, will you answer me that? A. I cannot do it without confining it.

Q. All right. A. As compared, I assume you mean, with the operation by water power at the price of \$72,000 for the land and the privilege and the rental of \$24,000, I should certainly expect that the new and modern plant would show a very material increase in the net income.

Q. About how many thousands of dollars per annum? A. Why, I should have to spend some time —

Q. Oh, well, give us an approximation. A. I cannot approximate it.

Q. Would it be twice as much? A. I cannot say.

Q. Three times, four times? A. I have made no investigation of income whatever.

Q. Give us an offhand opinion of it. A. Oh, I cannot do that. I don't give snapshot answers.

Q. Can't you approximate it? A. No, sir.

Q. Now, for a moment, do you believe you could make more than \$23,000 with your ideal plant? A. I have formed no opinion on that subject.

Q. Do you think you could make, with your ideal plant, any more than 40 per cent. of your gross income for net income? A. Well, I can almost answer that question, but not quite.

Q. If you cannot quite, why, you cannot answer it at all. A. I have not studied the rates up there enough to be quite able to answer that. I might make a little more than 40 per cent. of the gross with a new plant there.

Q. It would be approximately 40 per cent. net, wouldn't it? A. Well, it would be likely not to vary very much one side or the other from that.

Q. And it is a fact, isn't it, in this Commonwealth, that the electric plants that make 40 per cent. net are doing a good business? A. I cannot say that that is so.

Q. Haven't you examined the Gas Commissioners' reports? A. Not enough to form an opinion upon that question.

Q. Aren't you conversant with the general results of the operation in this Commonwealth of electric plants? A. With the general results, I think I am, in a general way, conversant.

Q. Well, wouldn't your conversancy tell you — doesn't it tell you — that 40 per cent. net is pretty good? A. In a small plant in the country it would be.

Q. Well, assume it is in a city of 50,000 people. A. That would be pretty close to a fair average, I should think — 40 per cent. net income.

Q. Isn't it a fact that the plants in cities of 50,000 people or more make about that rate, whether the plants are old or new? A. Well, the Gas Commissioners' returns show that they do.

Q. Now, Mr. Warner, you have made your ideal structure

to meet the needs not only of the present, as I understand you, but of the future? A. I have—

Q. Is that correct? A. It depends upon which schedule you refer to.

Q. I am not referring to any schedule. I am referring to your ideal plant.

Mr. GREEN. He has two of them constructed.

Mr. BROOKS. Has he got more than one set of buildings shown up here?

Mr. GREEN. No, but he has testified he would use a different size floor plant in one case than the other.

Mr. BROOKS. I don't know as that makes any difference.

Mr. GREEN. He asks which one you refer to.

Mr. BROOKS. I am going to simply ask this:—

Q. In the ideal plant of 725 kilowatts capacity you provide, don't you, for the future needs? A. It was my intention to do so, fairly.

Q. That 725 kilowatts is 16 mill powers, isn't it? A. Well, you cannot—

Q. Close to it, isn't it? A. —so consider it.

Q. What is that? A. It would hardly be.

Q. How many horse powers in 725 kilowatts? A. I will figure it out and see. I don't wish to split hairs over it.

Q. What would that represent in horse power of steam producing this 725 kilowatts? A. You mean, what is 725 kilowatts equivalent to in horse power, do you?

Q. I mean, what is the amount of power necessary to produce 725 kilowatts, in horse power? A. Well, we will consider indicated horse power in the cylinders of the engines, as in the case of this general plan here. The efficiency is involved here.

By Mr. MATTHEWS.

Q. What do you mean by "general plan here?" A. The general plan of direct-connected units.

The CHAIRMAN. The question simply is how much power it takes to produce this result.

By Mr. BROOKS.

Q. It is substantially 16, isn't it? A. There is all sorts of power, depending upon the efficiency of the transmission system. You cannot pin the thing down.

Q. What is the engine capacity to produce 725 kilowatts? A. That is just what I am going to tell you if you will give me a minute.

Mr. MATTHEWS. It depends, if your Honors please, where you measure the power.

Q. Now, I will ask you what engine capacity? A. The engine capacity, the capacity to produce 725 kilowatts delivered to the lines, at the switch board, from the cylinders of a direct-connected plant of this type, would be approximately 1,190 horse power.

Q. 16 mill powers is 1,040? A. 16 mill powers depends upon the efficiency of the wheel; but assuming an average efficiency—

Q. Assuming they have got good wheels. A. Assuming they have got good wheels, it gives off about, if they are fairly well loaded, 65 horse power per mill power, and that is equivalent to about 1,040 horse power.

Q. Do you know whether or not it is a fact that water power is being developed in places where coal costs \$4 a ton and where coal costs \$1.50 per ton? A. Well, now, I have to give two answers to that, as to the two prices of coal. I know that this is a fact, that water power is being developed where coal costs \$4 and where the water power is suitable. I do not know of any case where water power is,—let's see,—well, I think perhaps I do know of one place where water power is being developed where the cost of coal is as low as \$1.50. The circumstances are—

Q. That is an answer to my question. Do you know it is a fact that water power has increased in development in both the United States and Canada in the last five years? A. Well, there has been a great advancement in development, yes. Lots of power has been developed in the last four or five years.

Q. What improvements in water power have there been in the past ten years that you recall? A. The most important improvement, the two most important improvements, are a slight betterment in the efficiency of wheels and a very great betterment in the ability to govern the speed of the wheels closely.

Q. Is there any trouble at this plant of the Holyoke Water Power Company, so far as you know, with the style of wheels used there? A. Well, I—

Q. Or wouldn't you want to express an opinion? A. I should much prefer wheels with horizontal shafts. Those wheels have vertical shafts, and the power has to be transmitted through gearing, which is inefficient and noisy and may break.

Q. They are inefficient? A. Inefficient—the gearing is inefficient. That is a vertical shaft: you have got to use the power from a horizontal shaft, and you have got to make a right angle turn there in the gearing. That is the great objection. That occurs to me on the instant, so far as the governing is concerned. I have made no test to determine how closely those wheels govern.

Q. If you cannot tell, let it go. What I am going to ask you now is this: What loss is there in the gears? A. I don't know.

Q. Did you make any test to discover? A. I did not.

The CHAIRMAN. Loss in what?

The WITNESS. In the gears.

Q. What tests have you made to discover the amount of inefficiency, if any, there is there? A. Where? The amount of inefficiency?

Q. In the gears and wheels, because they are vertical. A. I have made no test.

Q. How are the wheels at the Niagara development? Are they vertical or horizontal? A. The wheels at Niagara rotate in the horizontal plane and so do the generators. The generators are direct-connected.

Q. They do not have vertical wheels at Niagara? A.

Vertical shafts, yes, and horizontally rotating generators, direct connected.

Q. I didn't ask you about generators; I asked you about wheels. The wheels at Niagara are vertical, aren't they? A. Yes, sir.

Q. They have gearing, do they not? A. No, sir.

Q. In any of that plant, do you say that the vertical wheels at Niagara have no gearing? A. Do you mean in the Niagara —

Q. The Niagara development. A. Well, there is a lot of development there. Now I want to be sure and answer you right.

Q. The biggest development there is there. A. Well, the biggest development there is there has got wheels applied in several ways to different classes of things. If you mean the electrical development —

Q. I do not care about electrical development: I am talking about the water development. Are not the wheels of the biggest development there, the largest water development there, vertical; and don't they have gear? A. They are vertical, and the biggest development there to my knowledge had no gears whatever.

Q. Well, do you recall any large development there that has vertical wheels and also has gears? A. I do not.

(Noon recess.)

AFTERNOON SESSION.

ROBERT L. WARNER, *resumed*.*Cross examination by Mr. Brooks, continued.*

Q. You say, Mr. Warner, that you inspected the present hydraulic plant for the purpose of determining the life of the various elements that go to make it up? A. Partially that. I inspected it partially for that purpose.

Q. And did you arrive at a determination as the result of an inspection and examination of the physical features of the water plant connected with the electric light plant? A. So far as I was able, I did.

Q. Be kind enough to give me in detail, if you please, your opinion of the life of the various physical elements that make up this hydraulic plant. A. I should consider that much of the foundation work, brickwork, concrete work and excavating—work of that nature—will endure for a very long time.

Q. How many years do you calculate? A. It might last for an average—it might stand for an average of 50 or 60 or 70 years.

Q. Or a hundred? A. It is possible that some of it might last a hundred years.

Q. What is there in—perhaps you had not finished the answer to my question? A. You asked for the various details that go to make up the water plant.

Q. I will come back to that in a moment. The wheel pits, the tail races, the foundations, the masonry, with ordinary care would last more than a hundred years, in your opinion, wouldn't they? A. I should hardly think so.

Q. Did you hear Mr. Kirkpatrick's testimony as to his opinion of the life? A. I did not.

Q. Of the physical features? Would you think that they would last 130 years with proper care, ordinary attention? A. Oh, I should think it very questionable. It is a very long time.

Q. Take the other elements that make up the hydraulic plant. Give me your opinion of their life from time of installation, assuming, of course, you will, with me, that proper attention and regard in the way of repairs is made to these various elements. A. Due to wear and tear only —

Q. Will you give me the years? A. You mean the years during which their usefulness will continue?

Q. The years during which they will continue to live. I suppose if they cease usefulness they are dead. A. Their usefulness might be discontinued through advancements in the art or an increase in efficiency of existing manufactured wheels before they were actually worn out.

Q. Very well, I see your point. How long will they live, in your opinion, depreciated for age and wear and tear, providing proper care and attention in the way of repairs is extended to them? A. I do not know that it is possible to analyze each feature of that water power installation into a definite number of years of exact life.

Q. I am asking you to approximate in your opinion their life, allowing for depreciation due to age and wear and tear and assuming that proper care and attention is bestowed upon the various parts. A. I have covered that in an assumption that the average life of the whole water power installation will be 40 years.

Q. Well, that is hardly answering my question, I submit. A. That is to say, the average life of usefulness of the whole installation.

(The question was read.)

The WITNESS. Is there a question?

Q. There is. A. I thought I had answered it.

Q. I thought you did not, and so I had him repeat it. A. Well, I assume —

Q. If you cannot tell me, I will draw on to something else. A. Yes, I cannot tell you the exact number of years.

Q. I do not ask for that. I said approximately. A. Well, I have covered it in a —

Q. Your opinion, approximately, of the number of years that the various elements constituting the hydraulic plant will

live, if you take out depreciation due to age and wear and tear, and consider that proper attention in the way of repairs is bestowed upon the plant.

Mr. MATTHEWS. If you take out depreciation?

A. Well, if you take out depreciation for age and wear and tear, you have only depreciation due to advancements in the art.

Q. What is this in reply to? A. That is what you said,—if you take out depreciation due to age and wear and tear—

Q. That is what I say. I say it now. Allowing for depreciation for wear and tear, what is the life of the various elements of this hydraulic plant, if you also allow that proper care and attention is bestowed upon the various elements in the way of repairs? A. I should think those wheels themselves, with their shafts, with average care, might last 25 or 30 years, perhaps. The governors probably would not last so long, nearly so long. The removal of the wheels at the end of that time would involve destruction of part of the wheel pit.

Q. I do not ask any such thing as that. A. It is involved in the depreciation.

Q. I claim it is not. I am asking you for the life in years approximately of the various elements that make up this hydraulic plant. A. I have covered that—

Q. Due to wear and tear and age. A. I have covered it in the wheels and governors. Now I proceed to the hydraulic work which surrounds the wheels. I say that that due to no other thing except wear and tear might stand for—

Q. I have included age. A. Well, age is a question of wear and tear.

Q. You have put it in your schedule age and wear and tear, as I recall it. However, I will stick by age and wear and tear.

A. That due to that thing alone, without reference to whether new wheels would fit it or not, it might last 40 or 50, 60, 70 years.

Q. That is, the wheels and their adjuncts? A. No, not the wheels: the masonry surrounding the wheels. I said the wheels themselves would not probably last over 25 or 30 years at most. I have taken an average of 40 years.

Q. Is there anything else? A. That covers it.

Q. Age in any of the other elements? A. The hydraulic plant—

Q. The life of the other elements which make it up. A. Well, I think that those two general headings which I have used will cover it,—the wheels and appurtenances; that is, the casings, supports, governors, gears, and extra parts, shafting,—

Q. Will cover that probably 25 or 30 years? A. Couplings, boxes, etc., with the possible exception of the gears, the governors, and the boxes. I should think the remainder,—possibly, the steps under the wheels would have to be renewed,—but the remainder would last probably an average of 25 years,—may be more. Those smaller parts would wear out sooner. The masonry would last longer.

Q. Well, assuming the smaller parts were renewed—that is covered, I think, in my previous question, under the term repairs,—assuming that the small parts were renewed as it became necessary to renew them, what do you say then the life of these elements outside of masonry, wheel pit, tail race, etc., would be? A. Assuming that they were renewed. If you renew the governors, replace them, at the end of their usefulness you would derive a slightly different percentage for the whole—if you eliminate them. Perhaps I do not understand that question very well; will you read it again (to the stenographer), the last question.

Q. Well, I will. Assuming that proper care and attention—

The WITNESS. Read that last question.

Q. (Continued.) —are given to repairs of the various elements of the hydraulic plant, what do you say the life of the various physical features of the plant will be, aside from the masonry, wheel pit, tail race, excavation, etc., that you have already stated, from the time of its installation, allowing, as I have already put in my question, at present for age and wear and tear only. A. That leaves the wheels, casings,—

Q. Can't you answer me that without going into a mess of detail? A. You say excluding certain things. I am trying to think what that leaves.

Q. Just think it over to yourself and don't get it into the answer if you can help it. A. Yes, all right. I should say twenty-five or thirty years.

Q. Mr. Warner, have you had any experience in determining the life of Hercules water wheels? A. The value?

Q. The life? A. The life?

Q. And the life of hydraulic plants? A. Comparatively little.

Q. Did you know that there are water wheels in existence, to-day, doing good, efficient service, that have already passed a life of more than fifty years? A. I do not.

Q. You said you went to the Lyman Mills. Did you know that at the Lyman Mills there were water wheels doing good, efficient service, of an age already of more than fifty years? A. I did not.

Q. If you knew that, would that make any difference with your opinion? A. I don't think it would.

Q. What did you notice in the way of depreciation for age and wear and tear about any of the elements? Give me the details of it. A. I noticed that the gearing, both at the top of the wheels and in the governors, was very much worn. I noticed that in a general way. I was not able to get down into the wheels and examine their insides.

Q. Well, what other depreciation did you notice, due to age and wear and tear only, in this hydraulic plant? A. I could only see a fractional part.

Q. I am asking what you noticed, not what you didn't see. A. I noticed nothing more, except possibly the ordinary wearing of the exposed brick work and masonry.

Q. Did you notice any defects in the brick work and masonry? A. I don't recall any.

Q. Now you speak of gearing. The renewal of that would come under the general head of repairs, wouldn't it? A. I should consider it under the head of depreciation and renewals.

Q. Don't you consider renewals of small parts under the head of repairs? A. If the parts be small enough,—for instance, if you renewed the boxes and journals by re-rabbeting them, I should consider that a repair.

Q. Wouldn't you consider the renewals of small parts of a large mechanism under the head of repairs? A. The very small parts of it I probably should.

Q. How much did you allow for depreciation for age and wear and tear only in your schedule, or in forming the estimates of depreciation that you made in your schedule for this hydraulic plant? A. I should say in my mind that I allowed rather more for age and wear and tear than I did for the other elements of depreciation; namely, advancement in the art, necessity for extensions, and so on. I think the other elements—I think if I had had that in my mind, I should say that I may have allowed, in considering the question, 60 per cent. of depreciation to age and wear and tear and the remainder to—

Q. Now you have answered my question. I do not care about the remainder just this moment. So that 60 per cent. of your total depreciation would be the depreciation that in your opinion is due to age and wear and tear? A. I should think that would likely be so in the case of a hydraulic plant.

Q. That is what I am talking about, this hydraulic plant. They are building Hercules wheels right along, aren't they, of this very type that is in existence now, or don't you know? A. I can't say.

Q. That is, you don't know whether they are or not? A. I don't know.

Q. That is, you are not sufficiently familiar with hydraulic work and hydraulic plants to be able to answer that question? A. I don't know what they are doing with Hercules wheels, no.

Q. Then your total depreciation is, as I understand it, \$8,437 for the hydraulic plant? A. That appears to be correct.

Q. So that in dollars your depreciation that you allow for age and wear is \$5,062 or, substantially, \$5,000? A. I had not—

Q. Well, that is true, isn't it, upon the basis of your 60 per cent.? A. I don't think it is altogether true. I had not analyzed the thing in my mind to that degree.

Q. You just told me you thought 60 per cent. would be your allowance for age and wear and tear; therefore, you allow for the age and wear and tear, in dollars, substantially \$5,000, don't you, in your estimate? A. Well, I don't know whether I could say that I did do so. I might do so.

Q. Now, in your depreciation, as I see it, throughout your schedule, you have assumed certain annual percentages? A. That has been my method.

Q. That is, you assume a 6 per cent. annual depreciation for the present boilers, when used as they are being used now, intermittently, do you not? A. Where is that in the schedule?

Mr. GREEN. It looks like page 32, on the conditions of intermittent use, if you will examine that.

Mr. BROOKS. It comes under the head of Fixed Charges.

The WITNESS. Page 32, apparent depreciation.

(The last question was read by the stenographer.)

A. I assume an average of 6 per cent., yes.

Q. Well, you have got 6 per cent. for your boilers, haven't you? A. Yes.

Q. And that is when they are being used intermittently, as at the present time? A. Yes, sir.

Q. How much of that is due to age and wear and tear, and how much due to advancement in the art? A. I cannot say.

Q. Very well. Do you know how many days in all they have been used for driving this present plant? A. No.

Q. For instance, for the year 1898, do you know how long those were used for driving that particular plant? A. I do not.

Q. If you found that they had been in use, since their installation, only 50 days for driving the plant up to January, 1898, would that make any difference with your per cent. of depreciation? A. It would not.

Q. That is, if these boilers or engines stood in the store awaiting a purchaser, and had been there for a period of three or four years, your depreciation would be substantially the same, wouldn't it? A. It would not.

Q. What care have those boilers and engines had? A. The boilers appeared to have had very poor care.

Q. Very poor? A. Very poor.

Q. What did you notice that indicated any poverty of care?
A. An enormous amount of rust all over them; outside, a great deal of cracking and falling off of the lagging; from which I could only judge that they must be in equally bad condition inside.

Q. When did you make that examination, to come to that determination? A. Several times, since January, 1898.

Q. When was the first one? A. I think early in 1898.

Q. What are these boilers covered with? A. Some kind of —

Q. Asbestos, is it? A. Non-conducting material. I am not certain whether asbestos or some other compound. Something akin to that. Some sort of lagging or other non-conducting material.

Q. Did you know that those boilers now are insured to their full pressure as the result of the examination of the experts of the boiler insurance company? A. I have no knowledge on that point.

Q. That would make no difference in your characterization or calculation, would it? A. I cannot see how it would.

Q. You didn't notice the insurance certificate hanging right up there by the boilers? A. I cannot recall having seen it.

Q. That is, you have depreciated those boilers 42 per cent.? A. I believe that is right.

Q. And up to to-day it would be 60 per cent.? A. Yes — let's see.

Q. Three years more? A. Yes.

Q. You speak of depreciation due to extensions, I notice, in your testimony. A. Yes, sir.

Q. That is, you consider extensions depreciation? A. I considered that extensions of one section of the plant may involve the abandonment of an adjoining piece of apparatus or section of the plant before it is actually broken down.

Q. Then how much do you allow in any of your estimates for depreciation by reason of the extension of the plant? A. In endeavoring —

Q. Generally. I am not going to — A. Well, in endeavoring to arrive at the apparent depreciation —

Q. I don't know what that means. I am asking you simply how much do you allow for depreciation by reason of extensions? A. Well, I have only analyzed that under apparent depreciation. The actual depreciation I have determined without that.

Q. Now, why cannot you answer my question? If you cannot, just say so. I don't want you, if you can help it, to bring in any mere hearsay on the question. I do not mean it offensively at all. A. I understand.

Q. Can you tell me how much you allow in this schedule for depreciation by reason of extension to the plant? If you cannot, I will pass on. A. I have only taken that into account in a general way.

Q. Then you can't tell me, can you? A. I can't tell you specifically.

Q. Tell me approximately how much you allow in your per cent. of depreciation for depreciation by reason of extensions? A. I don't think it can be done.

Q. Now I am going to ask you one general question. Outside of the hydraulic plant, where you have allowed for four kinds of depreciation, perhaps five, age and wear and tear, action of the elements, advancement in the art, and depreciation on account of extensions, can you separate them so as to tell me what proportion of the depreciation you allow as for either one of these various kinds of depreciation? A. No, I cannot.

Q. It is your position, isn't it, that it is impossible to fix a rate of depreciation by a mere examination of the plant, without comparing the plant with a new and modern plant, as of to-day, and without a comparison of the operating expenses of the two? A. That is my belief.

Q. And it is upon that belief that you have acted in obtaining the various results in the line of depreciation that are contained in your schedule? Am I correct about that? A. That is the ultimate result, yes.

Q. You say that that is the only true test of depreciation, do you not? A. I believe it is.

Q. And that is why you speak in your schedule of depreciation as apparent depreciation? A. That is the primary reason.

Q. And, when you speak of apparent depreciation in your schedule, that is the depreciation that you refer to?

Mr. GREEN. No: which depreciation he refers to.

A. When I speak of apparent depreciation,—

Q. That is, you mean—

Mr. GREEN. Just let him explain it.

Mr. BROOKS. I am going to ask this question. I will withdraw that for the time being, because it will save my putting two or three more.

Q. When you speak of apparent depreciation, it is the true depreciation that is obtained by comparing a new and modern plant with one that is in existence, and by a comparison of operating expenses? A. No, sir.

Q. Haven't you said so? A. No, sir.

Q. Didn't you say so in your testimony the other day, that that is what you call apparent depreciation? A. No, sir.

Mr. BROOKS. Well, my friend, Mr. Green, shakes his head on that. I say that is just what you did.

Mr. GREEN. Pardon me: I thought you were mistaken.

The WITNESS. I cannot imagine how I could have said it.

Q. Let me see for a moment. "It is manifestly impossible to fix such a rate"—that is, depreciation—"closely by pure examination of the plant, without comparing the plant with a new and modern plant as of to-day, and without a comparison of its operating expenses. That is the final test and the true test of depreciation. That is why I call this depreciation apparent depreciation." Did you say that the other day in your direct examination? A. I believe I did.

Q. Do you want to take it back to-day? A. No, sir.

Q. You stick to it, don't you? A. Absolutely.

Q. Will you kindly turn, Mr. Warner, to Schedule A, page 2? In that you attempt to show the structural cost of the shafting, boxes, etc., in the tunnel, do you not? A. I do.

Q. Where are the items composing this estimate? A. I don't think I have them.

Q. Did you ever have them? A. Oh, yes: I had them and used them in making up this figure.

Q. Where are they? A. I don't know whether I have them or not. I used a great deal of stuff of that kind which I laid aside.

Q. From whom did you obtain them? A. I made measurements,—obtained them myself partly,—made measurements of the plant, to see the dimensions of the shafting and the length of it, which would be properly considered as with the water plant; and I employed that memoranda in taking up the general question of 'shafting, pulleys, etc., with the men in the Dodge Manufacturing Company, when I made up my figures.

Q. That is, you obtained your structural cost from the Dodge Manufacturing Company or some man connected with it? A. With his assistance, yes.

Q. You obtained your prices there? A. Yes.

Q. If I have not asked you, I wish to ask this: You never have planned any hydraulic plant that was ever built, have you, on the strength of your plan? A. Only in a general way.

Q. Have you ever planned a single hydraulic plant that was built upon your plan? A. Upon my plans, no.

Q. You take Mr. Main's estimates for your buildings, on page 4? A. I do.

Q. Whose estimates do you take for your buildings on page 23, the ideal buildings? A. I take my own.

Q. Did you obtain any of those from Mr. Main? A. I did not.

Q. Why did you take his for the present and your own for the ideal? A. Because the existing buildings involve an immense amount of structure which is out of sight, the character of which he had determined by an examination of plans.

Q. You had access to the same plans, didn't you? A. I could have had.

Q. Now it comes to this. You have made an estimate for your ideal plant upon the theory of a certain price per square foot of floor space, haven't you? A. I have.

Q. You cannot tell me how much of the various physical elements that go to make up the buildings, and so forth, of your ideal plant, you allowed for? A. I have not segregated it.

Q. Or the prices therefor? A. I have not segregated it at all.

Q. That is, for brick work or stone work or any of those? A. No.

Q. And it would be impossible for you to tell me now? A. It would be quite impossible for me to tell you now.

Q. You know nothing in your own personal knowledge about the prices that are going in Holyoke? A. For that class of work, you mean?

Q. Yes. A. No.

Q. Did you depreciate the buildings, or did you take Mr. Main's depreciation for the buildings? A. I took my own.

Q. How much of your depreciation for the buildings is due to age and wear and tear? A. I cannot segregate it.

Q. How much is due to the advancement in the art? A. I have not analyzed it.

Q. How much is due to the action of the elements? A. I have not divided it in that way, mathematically.

Q. Can you tell me? A. I cannot tell you.

Q. Then you cannot tell me how much depreciation is due to extensions? A. Only as I have taken —

Q. Can you? A. No, not separately.

Q. I am asking what my friend calls a concrete question. A. No.

Q. When did you make up your schedule which you have introduced in this case? A. I finished these schedules lately.

Q. When? I mean within a week or two or a month or two? A. I have finished them within a month, I guess.

Q. You have finished it within two weeks, haven't you? A. Well, maybe within two weeks.

Q. When did you finish the estimates of depreciation that are set forth in your schedule — within two weeks? A. No. I think about, — the estimates of apparent depreciation, — I

think I finished some months ago. I can't remember whether this year or last.

Q. Which of the various kinds of depreciation did you determine the amount of first? As I recall it, you have four or five kinds, I think five. A. I made an effort —

Q. Can't you answer me that, without telling me about your efforts? A. No, I cannot.

Q. You can't tell me which depreciation you considered first? A. Well, I think I considered wear and tear first.

Q. You gave it no per cent. outside of the hydraulic plant? Mr. MATTHEWS. I don't understand he did in that case.

A. I believe that I assumed, in making up the total, — I assumed a per cent. for wear and tear.

Q. Leaving out the hydraulic plant, what was your total for age and wear and tear that you assumed? A. On which branch?

Q. I am talking about the buildings, and so I will take the buildings. A. Let me see what the total is. You mean the existing plant?

Q. Yes, sir. You didn't depreciate the ideal, did you? A. I determined the rate which I used for the ideal, the so-called ideal, plant.

Q. If you can't tell me, I won't spend any time on it. A. I think I can.

Q. Well, what per cent. of your total depreciation did you have in mind and allow for, for age and wear and tear in the buildings, if you know? A. Let's see. Out of a total of 3 per cent. for the buildings —

Q. 3 per cent. a year? A. Yes. I think that I considered somewhere about 2 per cent. due to wear and tear and the rest to other causes.

Q. Then we can say you depreciated the buildings 2 per cent. a year for age? A. I think you might say that I roughly considered it that way.

Q. Did you so roughly consider it? A. I think I did.

Q. That is merely, I assume, an opinion with you? Have you got any memoranda that will refresh your memory on that point? A. As to the division of those percentages?

Q. Yes, sir. A. I may have.

Q. Have you it here? A. I think I may have. I find here, for instance, a memorandum —

(The last two questions were read by the stenographer.)

A. I find here a memorandum —

Q. Do you find any memorandum that refreshes your memory upon that question? A. Yes.

Q. As to what part of it you allowed for age? A. Yes.

Q. Very well. Now, using that memorandum, what part of this per cent. of depreciation of the buildings did you consider as due to age? A. I find $2\frac{1}{2}$ per cent. I have a memorandum here of $2\frac{1}{2}$ per cent. on buildings, of which I considered $1\frac{1}{2}$ as wear and age and the other extensions.

Q. I don't ask you about that. You now say you have a memoranda there saying you allowed $1\frac{1}{2}$ per cent. for age?

A. Out of a total of $2\frac{1}{2}$.

Q. Does that memorandum say so? A. Yes, sir.

Q. Let me see it, if you please. (Memorandum shown to counsel.) Now, is this a schedule or is it a memorandum?

A. Just a memorandum.

Q. So now you say you allowed $1\frac{1}{2}$ per cent. for depreciation on account of age? A. Out of a total of $2\frac{1}{2}$, yes.

Q. I don't ask you about the total.

Mr. GREEN. Why, he has two totals here.

Mr. BROOKS. He has $1\frac{1}{2}$ per cent. on the buildings for depreciation on account of age.

Mr. GREEN. On a $2\frac{1}{2}$ per cent. total.

Mr. BROOKS. I don't care about that. He has already stated that, and it shows in his schedule.

Mr. GREEN. I know; but he had spoken a moment ago of a 3 per cent. rate. He has got two schedules, one on a 3 per cent. basis and one on a $2\frac{1}{2}$ per cent. basis.

Mr. BROOKS. All right.

Q. Did you have another memorandum showing a total depreciation of 3 per cent. for the buildings?

Mr. GREEN. This is Schedule G, page 33.

Mr. BROOKS. That is the present buildings, as they are and where they are.

Mr. COTTER. Have you the other memorandum?

The WITNESS. I think I have.

Q. Perhaps I can help you. Did you figure on $2\frac{1}{2}$ per cent. depreciation of the buildings when the power was used as it is now, and 3 per cent. on the buildings when you have steam power alone? A. That is correct.

Q. Have you any memorandum of your 3 per cent.? A. Yes, I find one here.

Q. What is the allowance for wear and tear in your 3 per cent. depreciation? A. I have made the same allowance.

Q. And that would be age, of course? A. Yes.

Q. $1\frac{1}{2}$ per cent.? A. Yes, making a greater allowance for advancement and extensions.

Q. You depreciate the boilers, pumps, etc., in the boiler room 42 per cent. in seven years? A. I do.

Q. What do you say is the life of these buildings, assuming that proper care and attention and repairs are bestowed upon them? A. Well, I should think if they are maintained they might stand 60 years or 65.

Q. Or perhaps 100, with proper care? A. Oh, they might stand a thousand, but I shouldn't think it probable that they would stand over 60 or 65.

Q. You depreciated the engines a total of 21 per cent. in 7 years? A. I am willing to take your word for it. I had not looked it over.

Q. I am putting it as a question rather than an assertion. That is, it is 3 per cent. a year?

Mr. GREEN. What page is this? I did not know but you had the page in front of you.

Mr. BROOKS. It is the present plant.

Mr. GREEN. Page 3?

Mr. BROOKS. Page 6, B.

A. Yes, sir, 21 per cent.

Q. Are you aware that they had only had a service of six weeks up to Jan. 1, 1898? A. I was not aware of that.

Q. Would that make any difference if you had been? A. I was aware they had not been used continuously —

Q. That is not my question. A. No, I do not think it would. I do not think it would

Q. Did you open these engines up and make an examination of them? A. I did not.

Q. Did you take anybody's figures for that? A. The depreciation? No.

Q. Where did you obtain the price of your engines? A. From the builders of them.

Q. I think perhaps you had answered that before. And also of the boilers? A. I do not know who built those boilers.

Q. Where did you obtain the price new of the boilers? A. I obtained the price from the builders of steam boilers.

Q. These are known as Manning boilers? A. Yes, sir.

Q. Now, Mr. Warner, if you were going to buy an engine that had been in use somewhat, before you would come to a conclusion as to its value you would open it up and examine it, wouldn't you, under ordinary circumstances? A. I have not done so. I have bought several —

Q. I am asking you, wouldn't you? A. If it were a very large engine, I probably should.

Mr. BROOKS. (To the stenographer.)— Read me the answer —

The WITNESS. If it were a very large engine, I might.

Q. Well, you would not take somebody's statement for the condition of the engine, would you, unless it was somebody in your employ that you had reliance upon? A. I have done so in several cases.

Q. Take the seller's statement? A. I have done so in several cases.

Q. What do you do — take that in trade? A. I have done so in several cases.

Q. But with the statement you are careful ordinarily to have a warranty to back it up, aren't you? A. It depends a good deal on whom I am buying it of.

Q. Ordinarily, under ordinary circumstances, when you go to a stranger thinking of purchasing an engine that had been in use somewhat, you would open it up and examine it, would you? A. If it were an absolute stranger, I should be likely to.

Q. Can you give me now a schedule of the piping and fittings of the boiler room of your ideal plant, the amount that would be required and the prices? You do not do it in your schedule. A. I do not think I can.

Q. You did not estimate on the various elements that entered into the — A. Let me see how I have made it up here. I can tell you.

Q. 24? A. No, 25, item 5, \$6,000.

Q. Well, I know, but that is not what I asked you. A. I just call your attention to that.

Q. I am asking you, can you give me the details of that valuation? A. I cannot now.

Q. Could you ever have done it? A. Oh, yes —

Q. Where is it? A. I do not know.

Q. Was not that a lump — jump estimate? A. No, no.

Q. You cannot tell me anything with reference to the quantities? A. I cannot now, no.

Q. Or prices? A. I made that up perhaps two years ago. I made a list of piping and valves, and so on, covering all the stuff of that nature for a double piping system between those engines and boilers, and I took it up with Braman, Dow & Co., and went through it.

Q. And you got an estimate from them; is that the long and short of it? A. I got it with one of their men, and then I added a sufficient sum for contingencies and used the figure.

Q. That is, you took Braman & Dow's man's figures and then you added something to them, and that forms an estimate that is contained in your schedule; is that right about that, substantially? A. I knew —

Q. Can you answer my question? If you say no, all right; if you say yes, all right. A. I will say yes.

Q. Now will you look at your ideal plant? You have got that arranged for some spot up the river. Where do you get into the boiler room, according to that plan? A. You get into it — do you mean walk in, or get in with machines?

Q. I meant an entrance. I do not mean climbing in a window or anything of that kind; nothing surreptitious about it. A. I could get in through that door if I wanted to get in.

Q. Which door? Is there any outside door? A. Let us see if there is not a door shown.

Q. I would like to see how you wandered in — whether you flew in, or came down through the roof, or crawled in the window. A. Yes, I think this is the door here.

Q. You say that is a door? A. Yes.

Q. You think that is a door, do you? A. I know it is.

The CHAIRMAN. The witness ought to know what a door is.

Mr. BROOKS. I don't know about that.

The CHAIRMAN. Very well.

Mr. BROOKS. I do not suppose there is any judicial determination of that.

The CHAIRMAN. You can have your rights saved if you want to.

Q. You think that is a door? A. I haven't much doubt of it.

Q. You haven't much doubt that is a door? How does the superintendent get from his office into the boiler room? A. The door —

Q. How does he get in there? A. Well, now, he gets in through a door.

Q. Where is it? A. It is not shown on the plan. The plan is a ground plan. His office is on the second floor.

Mr. GOULDING. Why can't he float in in a dream?

Mr. BROOKS. He goes in, I suppose, when the depreciation comes out.

Q. How does your engineer get in from the engine room? A. Well, he would go in through a door which is not shown.

Q. Yes? A. This is a ground plan, as I have said.

Q. I know it is a ground plan. You have not paid much attention to this plan yourself, have you? A. Well, I have not considered it necessary to draw detail plans.

Q. You have not paid much attention to it, have you? A. Yes, I have paid some attention to it.

Q. You went to an electrical architect or engineer, or a firm of them, and had them get up a plan for you for the purposes of this case? A. I gave them —

Q. Isn't that so? A. Not altogether so. I gave them the—

Q. You say that is not so?

Mr. MATTHEWS. He is trying to tell you why it was not.

Mr. BROOKS. I have not asked him that.

Q. You went to somebody and you gave them the information that there was a lawsuit in the stocks, and you wanted a plan, didn't you? A. No.

Q. Or words to that effect? A. No.

Q. Did you tell them that you were going to testify in a case? A. I cannot recall whether I did or not.

Q. Did you tell them that this was going to be an actual plan? A. I told them it might be.

Q. Going to be erected by you or for you? A. I told them it might be.

Q. Yes. That is, you had hopes that it might be erected? A. I didn't say so.

Q. Well, you said it might be. Did you have— A. I said it might be.

Q. Were you looking for business for the Westinghouse people? A. I did not have that in mind in drawing these plans.

Q. Well, in getting them drawn? A. I am always looking for business for the Westinghouse Company as long as I draw a salary from them.

Q. I think that is proper. I have no doubt you are a very successful salesman. A. Thank you.

Q. What is that thing up there on top of the coal bunker? A. That "thing" is a track.

Q. A railroad track? A. Yes, sir.

Q. Where is it coming from? A. It is coming from the spur which I should hope to have connected with a steam railroad for delivering coal.

Q. Is there any particular steam railroad you have in mind for its connection with? A. I had not settled which steam railroad.

Q. You had not fixed on the particular railroad you were going to connect this from? A. I had not decided.

Q. What do you allow for building this railroad that goes up on top of your coal bunker and its connection with some other railroad in your estimates of cost? A. What I allow for what?

Q. For your spur track? A. For the spur track? I do not think I have —

Q. You have not figured on it? A. I have answered the question; let it go at that. I do not think I figured on it.

Q. What was the answer? A. I do not think I figured on it.

Q. Is it a fact that you allowed 2.5 per cent. a year for the depreciation of your buildings through the use of your engines and boilers, and their effect upon the buildings, when your engines and boilers are only used a few days in the year, and 3 per cent. when your engines and boilers are used all the time? Is that a fact? Look at schedules F and G. A. Yes, I am looking at those. Well, I have allowed —

Q. Just answer me that. A. I think you have mixed up engine and boilers. Perhaps I am wrong.

Q. I am talking about the depreciation of your buildings. A. Oh, I thought you said of the boiler.

Q. You allowed for the depreciation of the buildings when the engines and boilers are used only intermittently, as at the present time, 2½ per cent.? A. Yes, that is correct.

Q. When the engines and boilers are used all the time, you allow only 3 per cent.? A. Yes.

Q. Your dynamo building, I see you allow this ½ per cent. depreciation more there? A. You say I do?

Q. I say you do; I am only saying it as a question. A. I presume I do, if you say so.

Q. What effect do the engines and boilers have on the dynamo building of the present plant? A. I will be glad to tell you why I did that.

Q. You say you cannot? A. I will be glad to tell you why I made that as it is.

Q. Just answer this question. A. Read the question, and see if I can answer it.

(Question read.)

A. If used continuously, water power excluded, we should reconstruct sooner than if used as appurtenant to the water power.

Q. I don't know. I don't catch on to that; but I will ask you this question, Does the running of the engines and boilers of the present plant affect the depreciation of the dynamo building? How does it affect the dynamo building? What vibration comes from the engines and boilers? A. I will tell you how it affects it if you will let me do so in my own way. I cannot do so in one word or two words.

Q. That is all right: you have a fair scope. A. It does it this way: I have allowed $1\frac{1}{2}$ per cent. for wear and tear in both cases, whether intermittent use or continuous use of the same plant. But I consider that, if the steam plant be taken for continuous operation, the depreciation of the whole steam and electric plant in the buildings would be greater, even with the advancement in the art, than if it be used with the water power; that it affects the buildings not as to wear and tear, but as to extension of the buildings or remodelling them, or even abandoning them because they are not suited for modern apparatus.

Q. That is, most of your allowance is for depreciation by reason of the extensions and for advancement in the art on that particular building? A. In the case of 3 per cent., one-half of it is due to that.

Q. But, if you take your water power plant as it is,—I mean take it as you do in your schedule where you say it is advantageous to use water,—then you would not make any considerable changes, would you, in the dynamo building or the other building? A. I should make some very soon.

Q. I understood you to say in direct examination that the changes would be very few. A. They would be not so many, not so great, as in the other case.

Q. How much would it cost? How much have you estimated that it would cost under those circumstances? A. Oh, I have not made an estimate of the cost.

Q. I see that in your schedules, page 35 and the other pages, when getting your fixed charges to be used in determin-

ing actual cost of operation, you have charged interest at 8 per cent. ? A. Yes, sir.

Q. That comes into your operating expenses and is taken out of your profits ? That is true, isn't it ? A. No, it is not —

Q. Where does it come from if it does not come out of the profits ? A. I have not used it in that sense, you know.

Q. I know, but it must come from your profits, mustn't it ? A. Well, I have not used it in that sense, I say.

Q. Did you know that the Holyoke Water Power Company could borrow money for 4 per cent. and that the City could borrow money for less than 4 per cent. ? A. I made no inquiry concerning that whatever.

Q. That is, if you had taken 4 per cent. in each instance, you would have had a much larger capitalized difference, wouldn't you ? A. If I had used that figure, I would.

Q. Mr. Warner, stock that pays 8 per cent. right along year after year is worth how much, in your opinion ? A. Why —

Q. About 200 ? A. I own some that pays —

Q. I didn't ask you what you owned. A. Well.

Q. You were kicking the other day because you did not want me to pry into your private affairs, so I am very careful — A. I had better withdraw that, then.

Q. I don't want to have you assessed unduly. A. (To the stenographer.) You may withdraw that ; please strike that out. Please read the question. (Question read.) It depends on what kind of stock it is.

Q. If it is fairly certain dividend-paying stock at 8 per cent. it is worth considerably more than par in the market, is it not ?

A. An industrial is not, but a trans-continental railroad would be.

Q. Some industrials are, are they not ? I am talking now about a certain dividend-paying stock to the extent of 8 per cent. A. If it is absolutely certain it would sell on a 4 per cent. basis.

Q. Yes, it would sell two for one ? A. If it is an absolute certainty it would sell on a 4 per cent. basis.

Q. In your schedules, I see, of the cost of operation by the various methods you have charged 1-2 per cent. on the structu-

ral value for maintenance for both the hydraulic and the steam plants? A. I believe that is correct; I believe I figured that throughout.

Q. That is, your repairs upon the one, as you estimate them, are just as large a per cent. as on the other? A. Why—

Q. Isn't that so? A. Yes—

Q. According to your schedule? A. Yes, I assume that.

Q. Did you ever build a cooling tower? A. No.

Q. Did you ever plan one? A. No.

Q. Did you ever operate one? A. No.

Q. Where do you get your costs of operation, from what source? A. My what?

Q. Costs of operation for your cooling tower? A. I have charged no cost of operation for the cooling tower.

Q. What? A. I have charged no cost of operation in the schedules to the cooling tower.

Q. You do allow, don't you, for cost of operation for cooling tower indirectly? A. Yes, indirectly.

Q. From what source do you take your estimates for any such allowance? (The witness took up a copy of his schedule.) I asked you from what source; use anything you have a mind to. A. I can tell you the source from which I have the cost of the cooling tower.

Q. The cost of operation? (Witness examines schedule.) Well, you get it from somebody. A. Well, I have. The cost of operation of cooling tower is trifling.

Q. I did not ask you whether it was trifling or whether it was monumental. A. Well, it is trifling—

Q. I asked you from what source you took it. A. I didn't take it from any source.

Q. From what source did you take the cost of your cooling tower? A. I took it from a price quoted me by Henry Worthington.

Q. Henry who? A. Henry Worthington.

Q. Whose estimate was the size of the cooling tower? A. His.

Q. Did you give him any detail? A. Yes.

Q. Did you give him a schedule of the plant that was to be operated? A. No.

Q. How much water do you calculate you use in your plant for condensation if you run it entirely by steam to its limit of 725 kilowatts? A. By cooling tower, do you mean, or otherwise?

Q. I was going to ask you either way or both. A. Either way. Why, if you run condensing, taking water from the canal —

Q. How many million gallons a day? A. Taking water from the canal, you use about 25 or 30 times as much condensing water as you would feed water.

Q. I don't care anything about that. A. I will have to figure that out —

Q. I have knowledge enough to know that. A. Well, I will have to figure that out at great length. It will take me some time to do it, Mr. Brooks.

Q. How many million gallons of condensing water did you allow per day? A. I cannot give you the figure; I can figure it out.

Q. For the cooling tower process? A. In the cooling tower process the same water is circulated over and over.

Q. Except what it loses in evaporation? A. What is that?

Q. Except what it loses in evaporation? A. Well, that is more than made up in the feed water that comes in.

Q. What is the capacity of your cooling tower in gallons? A. It has an average capacity, under good conditions, of 10,000 pounds of water an hour cooled — 10,000 pounds of steam an hour cooled.

Q. I did not ask you about the pounds; I did not know but you could give it to me in gallons. A. It depends altogether on the load under which the engine is operating, and so on.

Q. The maximum load, I say, that gives you this load of 725 kilowatts. A. I have not provided for any load of 725 kilowatts at all.

Q. Assuming the maximum load. A. On the existing plant?

Q. Yes. A. There would be evaporated —

Q. If you can give it quickly. A. I can answer it. (Examining schedule.)

Q. I will let it go if you cannot give it to me very quickly.

A. I can give it to you very quickly.

The CHAIRMAN. Give it to him in the morning.

Mr. BROOKS. You can give it to me in the morning.

The WITNESS. All right.

Mr. BROOKS. If I want it.

(Adjourned to Saturday, Dec. 22, 1900, at 10 A.M.)

FIFTY-SECOND HEARING.

Boston, Saturday, Dec. 22, 1900.

The Commission met at the Court House at 10 A. M.

ROBERT L. WARNER, *resumed.*

Cross examination by Mr. Brooks, continued.

Q. Mr. Warner, in Schedule P, on page 45, under the operating expenses of the existing water, steam, and electric plants, I notice that you have, for engineers and firemen and helper and chief engineer, charges which amount to \$4,376. Am I correct? A. I haven't added it up.

Mr. GREEN. You mean the first four items, Mr. Brooks?

Mr. BROOKS. Yes.

The CHAIRMAN. Yes, that is what it amounts to.

Q. Did you answer that? A. I believe that is correct.

Q. Did you know that the present plant that operates this electrical plant cost the Holyoke Water Power Company but \$2,300 a year? A. I didn't know that.

Q. Would that make any difference in your estimate, if it were a fact?

(The preceding question, "Did you know that the present plant," etc., was read by the stenographer.)

Mr. BROOKS. Both plants combined; engineers, firemen, helper, chief engineer.

Mr. GOULDING. Labor; not for rent.

Mr. BROOKS. Oh, no; simply covering these four items.

Mr. GREEN. May I ask you if that labor in your question includes men corresponding to the trimmers?

Mr. BROOKS. It simply corresponds to the first four items of your labor schedule.

Mr. GREEN. The first four items on page 45.

The WITNESS. I used those same figures throughout, in all comparisons.

Q. Would it make any difference in your estimate if you found that the actual expense was only \$2,300 a year? A. It would make no net difference, no, in the result.

Q. Where did you obtain information with reference to the price paid in Holyoke for engineers and firemen and helper, and for labor generally? A. I obtained it partially, in a general way, from my knowledge, my general knowledge of the prices paid that class of men; partially from inquiries made from time to time in Holyoke.

Q. You had no knowledge yourself with reference to the prices that governed in Holyoke for this class of labor? A. Only to that extent. I had hired no men personally.

Q. Now from whom did you obtain any information that led you to make this charge of \$4,376 for the first four items of page 45? A. I believe that I discussed the matter with a number of men at Holyoke.

Q. I asked you from whom you obtained the information. A. I am trying to think. I think I had that question up specifically, among others, with Mr. Newell, with Kirkpatrick, with some of the people in the Lyman Mills, and others.

Q. Who in the Lyman Mills? A. I can't recall absolutely whether I discussed it with Mr. Lovering or with the master mechanic.

Q. You charge for oil, waste and other supplies, in your schedules, the same, whether the present steam plant operates continuously or for a small portion of the year, do you not,—namely, \$620?

The CHAIRMAN. That is on page 45.

Mr. BROOKS. Pages 41 and 45.

The CHAIRMAN. That is so, evidently, isn't it, Mr. Witness?

The WITNESS. Well, I want to think of that a little. I want to compare the three schedules.

Q. I will take pages 41 and 45, the two schedules O and

B. A. Yes, it is so.

Q. On page 52 of your Schedule T you state the power required from the wheel shaft through the year averages 183 horse power. Where did you get that information? A. I believe I received that from Mr. Main.

Q. Did you get any memoranda that went to make up that estimate? A. I think not. I think it was the result of investigation that he made. I think I received it from him verbally.

Q. Farther down you say, during the summer the average 24-hour load from the wheel shaft is 150 horse power. Where did you get that from? A. I think I received that from the same source.

Q. Where did you obtain your days of restriction, 45? From what source did you obtain that? A. I caused inquiries to be directed to the Company, by the Mayor, covering a number of questions.

Q. What mayor? A. Mayor Connors, I think, was his name.

Q. Did you have any communication with the Holyoke Water Power Company yourself? A. Not on that subject.

Q. That is what I mean, with reference to that. You received no letter from them on that subject? A. I had these questions —

Q. Excuse me a moment. Did you receive any letter from them? A. No.

Q. So that your information came from Mayor Connors, who told you that he had been told? A. The information was in writing.

Q. Where is the writing? A. I have it here.

Mr. BROOKS. Let me see it.

The CHAIRMAN. It ought not to take you very long to identify that letter, Mr. Witness.

The WITNESS. I want to see that I have no notes on it of my own.

(Paper handed to counsel.)

Q. Do you know of your own knowledge who wrote these memoranda in pencil and ink? A. Those pencil memo-

randa are computations which I made. The ink memoranda were there when it was returned to me by the mayor.

Q. You don't know whose handwriting it is? A. I don't recognize the handwriting.

Q. You don't know, if he obtained any information, from whom he obtained it? A. Only so far as I have told.

Mr. BROOKS. Mr. Matthews, I would like to have you impound that for me, so that I can put on some testimony in rebuttal with reference to it.

Q. Is there any objection to Mr. Matthews's preserving that? A. If you will only get through with me to-day, you can have that.

Mr. BROOKS. I assure you that I will, but I won't promise for your side.

Q. In making your various deductions to which the \$45 rebate was applicable, you based your calculations that led up to the deductions upon this paper that you have just handed me? A. I based them on that; yes, sir.

Mr. MATTHEWS. Mr. Brooks, both sides would like to have that marked for identification, I suppose.

Mr. BROOKS. Yes, sir.

(The paper was marked "Identified Dec. 22, 1900, F. H. B.")

Q. I understand you to say that you obtained this memorandum from Mayor Connors? A. Yes, sir.

Mr. BROOKS. Mr. Matthews, at this point, if you have no objection, I would like to put in two coal bills of the Holyoke Water Power Company, showing what they paid for coal in the years 1897 and 1898.

Mr. MATTHEWS. What is this?

Mr. BROOKS. I want to put in two coal bills, which are for coal that was used at the electric plant at the point of time nearest to January, 1898, purchased, I think, in the fall of 1897, and which were referred to in Mr. Whitham's testimony, Volume 4, page 254, where he says that the coal costs \$4.05. You will see those show a cost at New Haven of \$2.95 a ton, \$1 a ton freight, making \$3.95, and 10 cents for unloading, making \$4.05.

(Mr. Matthews examined the bills with Mr. R. C. Winchester.)

The CHAIRMAN. Will this delay the cross examination or do you want to use it for that purpose?

Mr. BROOKS. I do not care about using it. I thought it would be well to put it in at this time, as I thought of it.

Mr. MATTHEWS. All right.

The bills were marked as one exhibit "Ex. 148, F. H. B.," the material parts of the same being as follows:—

ANTHRACITE
AND
BITUMINOUS.

THE BENEDICT & PARDEE CO.,
WHOLESALE DEALERS IN COAL.
Office, 98 Meadow Street.

NEW HAVEN, CONN., Sept. 14, 1897.

Sold to the HOLYOKE WATER POWER Co., Holyoke, Mass.

<i>Car No.</i>	<i>Weight.</i>	<i>Coal.</i>	<i>Gro. Tons.</i>	<i>Cwt. lbs.</i>	<i>Price.</i>	<i>Amount.</i>	<i>Total.</i>
27		Geo. Creek	91	1,740	\$2.95		\$270.74
1123							
373							
1165							
14389							
14217							
1473							

Paid Oct. 21, 1897.

THE BENEDICT & PARDEE CO.,
Per HUNTINGTON.

HOLYOKE, MASS., Sept., 1897.

HOLYOKE WATER POWER Co.

To BOSTON & MAINE RAILROAD, *Dr.*

For transportation and charges on merchandise, as stated below:—

<i>Date.</i>	<i>Pro. No.</i>	<i>Car. No.</i>	<i>From.</i>	<i>Articles.</i>	<i>Weight.</i>	<i>Rate.</i>	<i>Freight.</i>	<i>Advanced Charges.</i>	<i>Total to collect.</i>
16	4215	H.	W. H.	Coal	205,580		\$91.78		\$91.78
		27	No. 2.						
		1123							
		373							
		1165							
		14389							
		14217							
		1473							

Paid,

T. CONNOR, *Cashier.*

Q. You complain, do you not, Mr. Warner, because you think that the machines in the present electric plant are much larger in number than they would be as compared with the machines that you would install in your ideal plant? A. I do not complain.

Q. Very well, I will change my question. You make, as a criticism, do you not, that there are a larger number of machines in the present plant than there would be in your ideal plant? A. Yes.

Q. How many engines are there in the Holyoke Water Power's present plant? A. Two.

Q. How many in your ideal plant? A. Three.

Q. Four, aren't there? A. A little one for an exciter; yes, sir.

Q. Well, four. How many generators, of all types, in the Holyoke Water Power Company's plant? A. I believe there are 26.

Q. 25, are there not? 25 or 26, put it that way. How many different machines in your ideal plant, including generators, exciters, motors, and constant current transformers for the street lighting system? 15, are there not? A. I am just hesitating whether I would rightly answer that calling them all machines.

Q. Well, I am going to call them machines. A. Well, you can call them machines, and I will answer you.

Q. I will put it this way: you have in your ideal plant three generators, have you not, three exciters, two induction motors, and seven transformers for arc light circuits? A. I will see.

By the CHAIRMAN.

Q. Don't you know how many, Mr. Witness? A. I cannot recall instantly the number.

Q. Why don't you refer to your plan? A. That does not show the heavy transformers, your Honor.

Mr. BROOKS. Let it go.

Mr. WITNESS. I want to hurry as much as I can, but I want to be right about it.

Mr. BROOKS. Yes.

The WITNESS. Will you give me the page on which those transformers are, Mr. Brooks?

Mr. BROOKS. I cannot. I have a memorandum of the fact, but I have not the number of the page.

The WITNESS. Just read me the numbers.

(The stenographer read from Mr. Brooks's question: "3 generators, 3 exciters, 2 induction motors, and 7 transformers.")

The WITNESS. That is right.

By Mr. BROOKS.

Q. It is true, is it not, that the electricity that you generate in your ideal generators cannot be used directly in operating your arc lights? A. It must be transformed.

Q. You have to transform it through constant current transformers? A. That is correct.

Q. And you propose using 7 of those in your ideal plant? A. That is correct.

Q. Your ideal plant you develop, do you not, to the extreme capacity of the building,— of the ideal building? A. I think not.

Q. Where do you put in any additional boilers in your ideal plant? A. I have explained that this plan —

Q. I don't want that. I am asking you now where you place additional boilers in your ideal plant? A. I must certainly explain that this building I have figured on is wider this way (indicating on plan), leaving room here for extensions.

Q. That is, you are going to have your building wider than that depicted upon the plan. How much? A. They are two different plants. For the 575 K. W. plant —

Q. How much wider are you going to have your building, that is all I was after, than the drawing depicts? A. In the 575 K. W. so-called ideal plant the units are smaller —

Q. I am asking you only about the boilers. A. The boilers are smaller, and would occupy less room. The building is 93 feet wide. This one is 85 feet 8 inches.

Q. Now for your 725? A. 98 feet in the case of the 725 K. W. plant.

Q. And on your alternating current system you have to transform your current before using it in operating incandescent lights, do you not? A. That is correct.

Q. Then it is true, isn't it, that in your ideal system the electricity when it leaves the generator cannot be used unless it is first put through some kind of a transformer for either arc lighting, incandescent lighting, or operation of motors? A. That is correct.

Q. By the way, where did you obtain or from what source did you obtain the prices as of January, 1898, for the various mechanisms that are installed in this electric plant in the way of electrical machinery — of the present plant, you understand? A. Oh, the present plant?

Q. Yes. A. I obtained them almost entirely, if not entirely, as to the electrical apparatus, from old price lists and existing price lists and memoranda in my possession, used in my own business.

Q. Now how did you obtain your price in January, 1898, for your constant current transformers for arc lighting, and the arc lighting system for your ideal plant as of Jan. 1, 1898?

The CHAIRMAN. What page is that on, do you know, Mr. Brooks?

A. Page 27. I shall have to refresh my memory a little bit on that.

Mr. BROOKS. (To the stenographer.) Read the question when he is ready.

The WITNESS. I understand the question. I understood from several sources that those transformers for arc lamps were being installed complete for \$35 a light, including the lamps.

Q. As of January, 1898, is that so? A. I am trying to think whether I understood it at that time or later.

Q. My question confines it to January, 1898. A. Yes. Well, I am not able to give you the date, whether I obtained that information then, or later, or before. It was not very far from that time. They were being built and installed.

Q. Well, had there been a constant current transformer built in January, 1898, such as you would install in your ideal plant? A. Certainly there had; yes.

Q. What? A. I believe that there had.

Q. Had there been one sold? A. I cannot say.

Q. Do you know of any that had been used in operating arc street lights in January, 1898? A. I cannot recall definitely whether I do or not.

Q. To the best of your knowledge where was the first one used commercially? A. So far as I know,—so far as I know myself,—the first one was used commercially at Hartford.

Q. In the Hartford Electric Light Company, with which Dr. Robb is connected? A. That is the one that Dr. Robb is connected with, yes.

Q. Now had any arc lights on January 1, the same as you would have in your ideal plant, been manufactured and sold on Jan. 1, 1898, or up to Jan. 1, 1898? A. Well, I cannot say positively whether at that date they had or not.

Q. According to the best of your knowledge and belief neither this kind of transformer nor this arc light had been put on to the market as early as January, 1898, had they? A. My belief is that they were offered on the market about that time.

Q. You know of no sales? A. I cannot swear to any sales.

Q. And you know of none in operation commercially? A. Not actually in operation, no.

Q. Do you know that the Hartford Electric Light Company made the first installation of these ideal transformers in May, 1898? A. I do not know that. I presume it is so if Professor Robb says so. They were probably contracted for before that time if that is the case.

Q. Why did you interject that? A. Well, strike it out. Mr. BROOKS. I ask to have it stricken out.

The WITNESS. I am entirely satisfied to have it.

The CHAIRMAN. I supposed that was just what you wanted. I didn't hear the last part of his answer.

Mr. BROOKS. It is the last part that I ask to have stricken out.

Mr. GOULDING. His supposition as to the contract being made before.

Mr. MATTHEWS. We think the last part of his answer was strictly responsive.

Mr. BROOKS. (To the stenographer.) Just read that question and answer.

The CHAIRMAN. Well, the witness asks to have it stricken out —

The WITNESS. I don't care —

Mr. BROOKS. (To the stenographer.) Go on and read it.

(The question and answer were read by the stenographer, as follows: "Q. Do you know that the Hartford Electric Light Company made the first installation of these ideal transformers in May, 1898? A. I do not know that. I presume it is so if Professor Robb says so. They were probably contracted for before that time if that is the case.")

Mr. BROOKS. That is what I was asking to have stricken out: "They were probably contracted for before that time."

The CHAIRMAN. The first part of the answer, "I do not know," may stand. The rest may be stricken out.

Q. I show you a Gas Commissioners' Report of January, 1899, and a list of 20 cities and towns —

Mr. GREEN. (To the stenographer.) I didn't hear that. Will you read that question?

Mr. BROOKS. It is the same list as is in Mr. Prichard's testimony, headed "Electric."

The CHAIRMAN. He has not finished his question.

Mr. BROOKS. I have not finished my question, no.

Q. —and ask you if there is one of those that did not operate a system similar to the Holyoke system of open air direct current arc lights, and that system only?

Mr. GREEN. Just a moment. Now I would like the whole question read, because it was the beginning that we did not understand, and do not know now what year is alluded to.

Mr. BROOKS. The year 1898. It is the Gas Commissioners' Report for 1897-98.

(The question was read by the stenographer.)

Mr. GREEN. I should object to that.

The CHAIRMAN. Do you want to be heard?

Mr. GREEN. We suggest that the Gas Commissioners' Reports should go in first before the question should be allowed.

Mr. BROOKS. It is pretty late to be making that suggestion.

The CHAIRMAN. You have been using all this information right along.

Mr. BROOKS. I know, but the other side have objected.

The CHAIRMAN. You have gone on the theory that you would allow that with your experts.

Mr. GREEN. I understood we were expected to have them introduced.

Mr. BROOKS. I thought Mr. Matthews said he was going to offer them.

Mr. MATTHEWS. We expect to offer them if they go in.

The CHAIRMAN. Any other objection, Mr. Green?

Mr. GREEN. That is what I had in mind. It seems to me they should go in first.

Mr. GOULDING. I think we have the right to ask this question without putting in the Report. We are testing his knowledge.

Mr. MATTHEWS. I think there is another objection to the question. It does not say what cities are in this list. Perhaps Mr. Brooks is going to state them, however.

The CHAIRMAN. Mr. Prichard's list, I understand.

Mr. BROOKS. Yes; used in his table headed "Electric Light."

The WITNESS. (To the stenographer.) Will you kindly read me the question?

(The question, "I show you a Gas Commissioners' Report of January, 1899, and a list of 20 cities and towns, and ask you if there is one of those that did not operate a system sim-

ilar to the Holyoke system of open air direct current arc lights, and that system only," was read by the stenographer.)

A. Well, for arc lighting —

Q. Just answer my question. A. I want to give you just the information you ask for.

Q. I want an answer, if I can get it, to my question directly.

The CHAIRMAN. (To the witness.) He asks you whether or not any of these cities and towns used any other system.

A. They used various systems for arc lighting —

Q. I want to confine my question just as I confined it. (To the stenographer.) Now read him the question once more.

(The question was again read.)

A. Well, I cannot say whether there is one or not.

Q. According to the Gas Commissioners' Reports is there one? A. The Gas Commissioners' Report —

Mr. GREEN. I think that is objectionable. I object to that. He says, according to the Gas Commissioners' Report, is there anything shown? The Gas Commissioners' Report, I submit, will speak for itself.

The CHAIRMAN. You have been using the Gas Commissioners' Reports for several days. You have not put them in; but we go on the assumption that they are going in, if competent, because you say you are going to offer them. I think the question is all right.

The WITNESS. I will have to examine the report at some length to answer that question.

Mr. GREEN. Look at it, then. I would like to be saved on that last.

Mr. BROOKS. We can arrange that in some other way. I won't wait for it if it is going to take any time.

The CHAIRMAN. Mr. Brooks says he can arrange it some other way.

The WITNESS. I am perfectly willing to give the information, if he will fix the question so I can.

The CHAIRMAN. Well, he says, if it is to take some time, he will let it go.

Q. Will you turn with me for a moment to page 10 of Schedule B. A. I have it.

Q. For how many years did you depreciate item 10? I will take out two or three examples here, and let the rest go.

A. I use one average for the whole list, an average of six years.

Q. Did you know that that item 10 was purchased in 1896? A. I presumed that that was so, yes.

Q. Did you know item 11 was purchased in 1896? A. It necessarily would be if the other was.

Q. And that item 13 had never been set up, never been used? A. I didn't know that.

Q. Is the same true of various items on page 11 of Schedule B? A. I presume likely it is.

Q. Take item 19? A. Yes, sir.

Q. Schedule B, page 11. Did you know that that was only one month old? A. Well, I felt sure it was quite new.

Q. And your depreciation there was six years? A. I used the same average throughout.

Q. And is the same true of pages 9 and 18 and 19? A. Yes, to an extent. Yes, I presume it is, without going through the items. There were some new things and some old ones.

Q. Did you know, Mr. Warner, that the City of Holyoke purchased electrical horse power for their purposes of the Holyoke Water Power Company, using the same but five hours per day, five days in the week, and nine months in the year, for \$40 per horse power? A. I don't know that I knew the rate. I knew the fact, but I don't think I knew the rate.

Q. Would that make any difference in your valuation? A. It would not.

Q. I understand you to say now that you are willing to withdraw your declination to answer certain questions I asked you the other day? A. I think I am.

Q. Then I will repeat them, because I think you ought to have the opportunity. What plants in Southern New England did you engineer for which you received compensation as an

engineer from the owners of the plants? A. The People's Tramway Company and the Putnam & Thompson Street Railway Company.

Q. Did you receive compensation as an engineer from any of that list of companies that you gave in your direct examination? A. Not directly, unless those two are included in the list.

Q. I think they were not. You gave certain others. But from any other company mentioned in your list, any commercial company mentioned in your list of qualifications, did you receive compensation as an engineer? A. Not directly; no, sir.

Mr. BROOKS. I think that is all I care to inquire.

Re-direct examination by Mr. GREEN.

Q. There was one computation that I asked you for before you went away Thursday last, which you said you would have. I understand you have not worked it out yet. A. I am not sure what it was. I am a little bit befogged at this moment on that. I will find it.

Q. Yes. A. I think, to answer it in a general way —

Mr. GREEN. I don't want it in a general way. Could you work that out for us and send in the result of your computation; and then we can have him come back and examine him on it, if counsel desire. Would you agree he may do that?

Mr. GOULDING. That is all right.

Mr. GREEN. That will be all right, then. If you will simply work it out and send it in. That is the computation relative to the value of water power on Sundays, on the supposition that we pay for it on those days at measured rates.

The WITNESS. Yes.*

Q. Mr. Warner, you were asked how you would value the stock of an electric light company, and you spoke generally of three factors that you would take into consideration. Will you tell us, somewhat at greater length, just what factors you would take into consideration if you were valuing the stock

* See page 240.

of an electric light company in Massachusetts, in a city of about the size of Holyoke? A. I should first examine the plant and determine its fair market value as a structure,— its operating value and its fair market value as a structure, irrespective of rates, franchises, and so on. I should determine that structural value as I have determined it in this case. I should make an examination of the going rates, and try to form an opinion as to whether the rates, the prices, for incandescent and arc lighting and power service, were likely to be reduced by any cause, by competition, by unfavorable action of the Gas Commission, or any other cause. I should get an opinion, a legal opinion, concerning the character of the franchise, to determine whether it was sound, whether it were permanent, or whether it were exclusive, with a view partially to determining whether there would likely be competition at some time. I should endeavor to form an opinion of the value of that franchise in a general way. I should investigate the character of the service; for instance, whether the street lighting, which is an uncertain element of income, were a large proportion of the gross income or a small proportion of it. I should try to learn whether there were good opportunities for extending the business, whether the town were a town of large mills or no or comparatively few small manufactures, such a town as Lowell or Lawrence, perhaps, or whether it were a town of the order of Providence, full of hundreds of small manufactures, widely scattered, requiring power service. I should consider the character of the State laws relative to stock watering, to the limitation of stock issues, with a view to determine whether those laws practically excluded issuing stock in excess of structural value, or permitted larger issues of stock. Having gone into all those questions thoroughly, I should endeavor to determine the present gross and net income of the plant, and its probable income; and I think I should capitalize that income on some basis, as representing the value of the franchises and the business and the physical structures. I think that would be my method.

Q. You spoke of taking into consideration the opportuni-

ties for extending the business. Have you, in connection with this plant in Holyoke, looked into that at all?

Mr. BROOKS. How is that open on re-direct examination, may it please your Honors?

The CHAIRMAN. I do not think you have asked him any question on cross that covers that.

Mr. BROOKS. No.

The CHAIRMAN. If it is something you have overlooked—

Mr. GREEN. I should like to put it in on that ground, that I have not brought it out.

Mr. BROOKS. Go ahead, that is all right. I withdraw the objection.

Q. Have you looked into that, Mr. Warner? A. I didn't quite catch the question.

(The question was read by the stenographer, "You spoke of taking into consideration," etc.)

A. Not very thoroughly. I have made inquiries and a few figures, which lead me to believe that the opportunity for extending the power business is small.

Q. Why? A. Holyoke is a town, as I know it, of large mills built along the canals. It is not a town of small manufactures. The use of motors is incidental. Motors are used perhaps for ventilating here and there in schools; an occasional dentist may have a little bit of a motor.

Mr. BROOKS. Are you telling now anything you know or telling your belief? If it is what you know, I don't object to it.

The WITNESS. I was trying to bring out my belief—

Mr. BROOKS. If it is your belief, I do object to it.

The WITNESS. I was trying to bring out the opinion that, so far as my knowledge goes of Holyoke, from what I got there, it is a town of large mills, and not a town of small manufactures, and that the use of motors is likely to be incidental. I think I made a figure. I learned the number of motors which this Company has on its lines, and the motor load, and I think the size of those motors averages about $2\frac{1}{2}$ or $2\frac{1}{2}$ horse power. That would show to me that their use is largely incidental. I know that at Providence—

Mr. BROOKS. How is this competent?

The CHAIRMAN. Don't go into Providence.

Q. Speaking generally of other places, what is the motor size?

Mr. BROOKS. I object to it.

Mr. GREEN. I think, in order to show that $2\frac{1}{2}$ horse power average is small, as a general statement of the horse power average —

The CHAIRMAN. You can answer generally of the other places. A. Yes: generally, in towns of large motor service, large motor loads, towns where there is a good deal of small manufacturing, the size of motors will average about $5\frac{1}{2}$ to 6 horse powers each. That is a matter of general knowledge. So far as the incandescent lighting is concerned, I should judge that in a city of that character, a mill city, the opportunity for extending it would be limited, more limited than in cities of the general nature of Springfield and Hartford, for instance. The population of mill towns is likely to burn gas or oil lamps, and not likely to use incandescent lights in their residences to a great extent. The arc service, the street lighting service, is already an abnormally large proportion of the whole. I should doubt if there were an opportunity to extend that.

Q. What factor would that play in your estimate of stock in a place like Holyoke,—the fact that so large a proportion of the receipts of the Company came from the municipal street lighting? A. That introduces an element of uncertainty in the income, which is generally regarded — or by me regarded — as dangerous, if half your income or more, approximately that, is due to street arc lighting. You might get some change in the Board of Aldermen or some political turn which will cut you out of it. It is an uncertain income: it is a dangerous income.

Q. Whether or not that would affect your valuation of the stock? A. It certainly would.

Q. Returning to the question of small power, do you know whether or not the Water Power Company in the city of Holyoke sells water power from the shaft in small lots? A. I am informed —

Mr. BROOKS. How can that be competent?

The CHAIRMAN. Under some circumstances the City might have water power to sell itself.

Mr. BROOKS. But he says he is informed: it is merely hearsay testimony.

The CHAIRMAN. He can answer that question without going into information. You can produce more competent testimony on that, if it is objected to.

Q. Well, assuming for the moment that the Holyoke Water Power Company has got one or more very large mills in Holyoke where they sell water power off the shaft in small lots at \$30 a horse power a year, and that those mills are and have been for a long time vacant, and no takers for that power, would it affect at all your opinion of getting at the possibilities of selling electrical power in small lots?

Mr. BROOKS. I object to the question.

Mr. COTTER. Why wasn't that part of your case in chief? He gave the grounds and reasons for his opinion.

Mr. GREEN. But that has not come up in this form. He has given his opinion as to the value of this plant as an instrument for doing business; and he has taken into consideration, as I think it appeared clearly, the amount of business that this plant did, but not the income from this business. Now the question arose, if your Honor please, How would you value the stock? which incorporates all, takes in everything, franchise, business, and everything else. Mr. Brooks asked, in connection with that, "Wouldn't you take into consideration the possibilities of increasing the business, the possibility of selling more power, the possibility of selling your power electrically, if you had taken the 16 mill power, to reduce it to electrical power and take it out and sell it?" and he went into the prices and all that.

Mr. COTTER. Don't you suppose he gave us the result of his whole study when he gave us an opinion at the outset?

Mr. GREEN. He wasn't valuing stock, he was valuing the plant.

The CHAIRMAN. Assuming a lot of water power lies idle, how does that affect the electric light? Do you want to discuss that, Mr. Brooks?

Mr. BROOKS. I say it is entirely incompetent. I opened no such thing in my examination.

The CHAIRMAN. If Mr. Green wants to put it on the ground of something that he had omitted originally —

Mr. BROOKS. Certainly, if it is anything he omitted, I won't object upon that ground.

Mr. GREEN. I am not putting this question on that ground. I just want to clear it up. The other question I did a moment ago.

Mr. BROOKS. Now he has asked this question: Supposing this thing, that thing, and the other thing, what would you say? I say it is not competent.

The CHAIRMAN. I didn't catch what you said just now, Mr. Green.

Mr. GREEN. I said I didn't put this particular question on the ground that I did the one a moment ago, that you admitted. I do not put this on the ground that I forgot it. I put it on the ground that it is clearly competent on the line of entirely new examination introduced by our friends on the other side.

The CHAIRMAN. In what particular?

Mr. GREEN. They brought up the question of the valuation of stock. I asked this witness if, in considering the question of the stock,—

The CHAIRMAN. Come right down to the point. I understand that.

Mr. GREEN. They asked about present opportunities for future increase of business as bearing upon the value of the stock, and one of those that they called his attention to was the possibility of selling this entire sixteen mill power, developing a business in Holyoke and selling it electrically.

Mr. MATTHEWS. For power.

Mr. GREEN. For power and not for light; for power. And, as bearing upon that, I asked him a question, making a supposition which, we think, will be supported by evidence,—which we intend to support by evidence,—which involves the issue that there is a large amount of power in Holyoke sold from the shaft; water power, against which electrical power could not compete. That is, that we would have to use the water power

to turn into electrical power; we could not compete directly with the water power sold off the shaft in small lots; and that it is offered there, and that the buildings lie idle and there is no sale.

Mr. BROOKS. We say, may it please your Honor, that I never asked any such questions as my friend says I have. The question was this: whether or not net income would not be one of the main factors in his valuation, if he were sent by the Westinghouse Company to invest their capital in electric lighting apparatus. Now I do not say that he has not said some of the things that Mr. Green says he did. He said a great many things in this case, in answer to questions, that were entirely irresponsible. But that was the sum and substance of my question.

Mr. MATTHEWS. If you will pardon us one moment, we would like to look through the record and find Mr. Brooks's question.

Mr. BROOKS. Well, go ahead. I withdraw my objection if it is going to take long to go through it.

Mr. GREEN. (To the stenographer.) Now if you will read the question.

Mr. COTTER. Is the objection withdrawn?

Mr. BROOKS. Yes, I will withdraw my objection to this question. I don't want to spend a great deal of time looking up four days' record.

(The question was read.)

A. It would.

Q. Can the 16 mill powers, all of it, be used as a practical proposition to develop electricity?

Mr. BROOKS. I object to that. It is simply trying his case over again. I withdrew my objection once. I am going to stand upon this one.

The CHAIRMAN. You went into that once.

Mr. GREEN. No.

The CHAIRMAN. Well, if you did not, I do not understand your theory. If you have not put that proposition over and over again, that the 16 mill power could not be used, because it was too expensive —

Mr. GREEN. No, it is an entirely different thing that I was coming to.

Mr. BROOKS. Nothing that I brought out.

Mr. GREEN. It came through some questions that I was looking over last night.

The CHAIRMAN. Put the question, and we will rule on it.

Mr. GREEN. Not on the basis that it is too expensive at all. Can it be utilized,—put it that way,—can the 16 mill power be all utilized in the running of a central electric light station?

The CHAIRMAN. I think that has already been gone into. We exclude it.

Mr. GREEN. The matter of storage batteries has been alluded to. Whether it was in the direct or not, I would like to bring this out.

Mr. BROOKS. I have never said a word about storage batteries. I talked about this—I did say something about the condensing tower, whatever it is called, the cooling tower.

Mr. GREEN. I am going to ask the Commission to bear with us a moment, while we find a line of questions here.

The CHAIRMAN. (After a pause.) What is the matter now?

Mr. MATTHEWS. We are trying to find the questions which opened up this line of examination upon our theory.

The CHAIRMAN. On cross examination?

Mr. MATTHEWS. Yes, sir.

Mr. BROOKS. I am not going to withdraw this objection for the sake of saving time. I have done it once. I am not going to do it again.

Mr. MATTHEWS. It will not take long, your Honor.

Mr. BROOKS. That is all right, take your time.

The CHAIRMAN. (After another pause.) What is your next question, Mr. Matthews?

Mr. MATTHEWS. We are waiting, if your Honor please, to find this question.

The CHAIRMAN. You said something about storage batteries?

Mr. MATTHEWS. It all comes in only if we find this question; otherwise not. The point is this—

Mr. BROOKS. You have not forgotten that I object to it.

Mr. MATTHEWS. No, sir, we want to be perfectly fair; we do not put these questions on the ground that Mr. Green omitted them by accident.

Mr. GREEN. I did one of them.

Mr. MATTHEWS. 'Yes, one of them;' but what we are coming to now covers this ground, as we understand —

The CHAIRMAN. Haven't you experts whom this can come from?

Mr. MATTHEWS. This expert hopes to leave the stand to-day, and we should like to bring this out from him as well as from the others.

The CHAIRMAN. This is an incidental matter. You can get it from your other experts.

Mr. MATTHEWS. Exactly, but I do not think your Honor understands this line of evidence as it lies in our mind. It is not our case at all, and therefore we did not ask Mr. Warner anything about it. Our theory of the law is that these unused opportunities for developing the business are immaterial and irrelevant, and therefore we did not ask this witness anything about them. Our theory is that we are to value the plant and pay for it wholly without regard to the money that the Company can make by developing the business which they have not to-day. On the other hand, the theory or one of the theories of our friends on the other side is that the Commissioners should take into account the unused opportunities alleged to exist for increasing the business. We did not go into the matter with the witness on direct examination, but we think Mr. Brooks did on cross, and Mr. Green is now trying to find the question, that is all. If he does not find it, we will subside.

(Reference was made by counsel for the City to a portion of the witness's cross examination during the fifty-first hearing, page 1666, as to the price paid for electrical power. After further discussion the consideration of the matter was suspended.)

Q. Returning to the question of the, or a, location for the plant suggested by you, whether or not you actually selected a site yourself or assumed one? A. I assumed one.

Q. And at whose request? A. At the request of counsel.

Q. In a general way, did you understand the general location and where the lot was? A. I did from counsel.

Q. You assumed in connection with the land what? A. That 40,000 square feet of land could be bought at 5 cents per square foot —

Mr. BROOKS. I submit, may it please your Honor, this was gone into on direct examination.

Mr. GREEN. It was not. We never asked him a word about the description of the land.

Mr. BROOKS. He has it in his schedule.

The CHAIRMAN. Go ahead, Mr. Green.

Mr. GREEN. It is only a question or two, and it makes clear some other answers of the witness which might otherwise appear —

Mr. BROOKS. Bad.

Mr. GREEN. Yes, which might otherwise appear bad. He answered some questions which you put to him —

The CHAIRMAN. I told you to go ahead, Mr. Green.

Mr. GREEN. Excuse me. I did not hear you.

A. That 40,000 square feet of land could be bought at 5 cents per square foot within a pole-line radius of two miles of the City Hall, up the river and near the river.

The CHAIRMAN. He has certainly given all that before, Mr. Green.

Mr. GREEN. He did not state the fact that he had assumed those facts.

The CHAIRMAN. If he did not, I must have dreamt them.

Mr. MATTHEWS. That was a fair inference, perhaps, from what he said. He did not say it in terms.

Q. You were asked in regard to the track which you have depicted over the coal shed in your new plant. You stated, as I recall, that you did not compute the expense of that. Why?

A. I have included the expense of so much of it as lies directly over the coal bunker, but not the spur which approaches the coal bunkers, for the reason that there is no such spur in the existing plant. This was drawn for a comparison with the existing plant.

By Mr. BROOKS.

Q. Do you mean by that there is no spur railroad track attached to the existing plant? A. A spur track avoiding cartage.

By Mr. GREEN.

Q. You mean no elevated one? A. No elevated one which goes directly into the boiler room or directly to the coal bunkers.

Q. The name of Mr. Newell was used by you in connection with the men who went down to the plant at the time you went down. Whether or not Mr. Newell was employed by you? A. He was.

Q. You stated, as I recall it, in substance, that you considered the volume of business done by this plant, but not the receipts, in getting at your valuation. If—

Mr. BROOKS. I object to that.

Mr. GREEN. Why?

Mr. BROOKS. The record shows. Why should there be a summing up on every question?

Mr. GREEN. Because on the basis of that I want to ask him a question calling his attention to some specific thing.

The CHAIRMAN. Of course in re-direct examination you have to call his attention.

Q. (Continued). If you had taken into consideration the receipts as well as the volume of the business, whether or not that would have affected the valuation that you have given of the plant?

The CHAIRMAN. Go ahead and answer.

The WITNESS. I do not quite understand that question. Will you read it?

(The stenographer read the question in full.)

A. I took the volume—

The CHAIRMAN. He asks you the specific question, and you are to answer, particularly in re-examination, as concisely as you can. He puts the direct question and asks for a direct answer.

(The question was read again.)

Mr. BROOKS. I suppose he can say yes or no to that.

The WITNESS. I cannot answer it yes or no. It would be entirely misleading if I should answer it yes or no.

The CHAIRMAN. Well, answer it; answer the question somehow.

The WITNESS. That involves a consideration of earnings which I have not considered at all. I have not treated the question in that way.

The CHAIRMAN. We all understood that you had not.

Q. You say you cannot answer that question yes or no?

A. That is the only way I can answer it.

Q. Very well. You were asked if you had built any cooling towers, to which I understood you to say that you had not. Do you know where any are built and in operation? A. There are—

Mr. BROOKS. Does not that question require a yes or no answer?

A. I do.

Q. Do you know where there are some? A. I do.

Q. Can you tell us where there are some cooling towers in active operation? A. There are at New York a number of them. The Edison Company has a cooling tower, I think, at its Duane Street station. It may be Pearl Street: I think it is the Duane Street station. That they have one I am certain at one of their stations, a large one. The Chicago Edison Company has a battery of towers, a number of them, quite a large installation. The Hartford Electric Light Company at Hartford has a cooling tower, has had for some time. I know that there are great numbers of them in various plants, the names of which I cannot remember, both in America and in England.

Q. Is there anything that you would suggest to say or that you desire to state in regard to your testimony relating to the loss of power in transmission from two miles out into the heart of the city, in addition to or correction of anything that you have said? A. I feel that I did not make clear that question of loss in that line. The question was asked on what basis I had figured the line—two miles of line—and whether I had taken into account that 5 per cent. average loss. I took that into account first in computing the amount of copper necessary

to carry the load. Second, I took it into account in connection with the operating expense in this way. I assumed that the output from this new and modern plant would be the same as from the existing plant, for the reason that, while there is an additional loss in that two miles of line, there is a very much less loss in the local distributing system because of the use of 2,200 volts replacing 210, 220, and 500 volt systems. In my opinion the losses would balance the gains.

Q. And is that the way in which you considered it? A. That is the way I treated the question of operating expense.

Q. And if land were taken in the city, near the centre of the city, or were used near the centre of the city for the purpose of erecting such a plant as you suggested instead of taking it two miles out, what items that you have used in your new plant could be applied towards the extra expense, if any?

Mr. BROOKS. I object to that. I have opened no such thing. If they are going to try the various phases of their case over again, I want to have an opportunity.

Mr. GREEN. I will withdraw it if it is objected to.

Q. You were asked by Mr. Brooks this morning about the arc transformers,—the 7 arc transformers, as I recall it, computed among the 15 machines, as he spoke of them. Whether or not the arc transformers have any rotating parts?

A. They have not.

Q. Whether their action is automatic or not? A. It is.

Q. Are they to be classed with machines in the same sense that dynamos are called machines?

Mr. BROOKS. I don't know about that: I object to it.

A. By no means.

Mr. BROOKS. I object.

The CHAIRMAN. Let him answer.

Mr. BROOKS. All right.

Q. You say by no means? A. By no means.

Q. One suggestion in regard to that plan,—the plan arrangement that you have exhibited, outlining a new plant. Can you tell where the cross section is taken? A. That cross section is taken through a point, I believe, below the floor in the engine room. I think that that section is taken through a point in the wall which does not show all the doors.

Q. You were asked in regard to whether or not the 3-phase system was not advised as against the use of the 2-phase system.

Mr. BROOKS. I never asked any such question.

Mr. GREEN. I most distinctly think you did, Mr. Brooks. You asked him about the General Electric, and whether a 3-phase system was not advised by them as against the 2-phase.

Mr. BROOKS. That is an entirely different question.

Mr. GREEN. And he said himself that sometimes he advised a 2-phase or a 3-phase system.

The CHAIRMAN. All right, go ahead and ask him.

Q. Can you state in a few words when you advise the 2-phase and when the 3-phase system?

Mr. BROOKS. I object to that. I never asked him if he advised anything.

The CHAIRMAN. I think you asked him some question about the superiority or inferiority of the 3-phase system over the 2.

Mr. BROOKS. I asked him the question, I agree, whether or not the General Electric Company did not advise a certain system.

By the CHAIRMAN.

Q. What is your opinion, Mr. Witness? That is what they want to get at. A. Good engineers of both companies use both systems.

Mr. BROOKS. I object.

The CHAIRMAN. We will hear it.

Mr. BROOKS. Save me an exception.

The CHAIRMAN. Very well.

A. The 2-phase system is employed where there is a large proportion of incandescent and arc lighting and a small amount of power; the regulation is slightly better with the 2-phase than with the 3-phase system. The 3-phase system is employed principally for power transmission, where regulation is less important and saving in copper is very important. Those are the principal considerations in the choice of one or the other of those systems.

Mr. BROOKS. I ask to have the answer stricken out.

The CHAIRMAN. What do you say, Mr. Cotter?

Mr. GOULDING. I should like to hear the question read.

(The question, "Can you state in a few words when you advise the 2-phase and when the 3-phase system?" together with the above answer, were read by the direction of the Commissioners).

Mr. GOULDING. I should like to know what power he refers to,—the power at the central station or the power that is being furnished.

By Mr. GREEN.

Q. Will you state, please? A. I refer to the power being furnished, its relative amount and the distance to which it is furnished.

The CHAIRMAN. We will read that question and answer in the light of the questions which you put, Mr. Brooks. If we find from examination that it is not responsive and does not meet that, we will exclude it; otherwise—

Mr. BROOKS. That is entirely satisfactory.

Mr. MATTHEWS. We would not want to have the admissibility of this question put by Mr. Green depend solely upon whether the answer to it is responsive to a question that Mr. Brooks put. Mr. Green's question is rather, to our mind, admissible because it relates to a subject that Mr. Brooks touched on in the cross examination. Mr. Brooks made a point, we will say, and we asked the witness on re-direct, as I suppose we had a right to do, something else to meet that point.

The CHAIRMAN. All right.

Mr. MATTHEWS. We put it on that ground rather than the other.

The CHAIRMAN. If it is admissible on any ground, we will take it.

Mr. GREEN. That is all.

Re-cross examination by Mr. BROOKS.

Q. You say that these constant current transformers are not machines. Am I correct? A. No, sir.

Q. I am not correct? A. No, sir.

Q. Well, you agree that they are a machine? A. I do, in one sense.

Q. Did I misunderstand you? I understood you to say to Mr. Green that they were not machines.

Mr. GREEN. My question was —

A. You misunderstood me, evidently.

Mr. GREEN. I didn't ask that.

Q. Did you say that they were not machines in the true sense of the word, or something of that kind? A. I said they were not to be classed with the dynamo machines. That is substantially what I said. Not machines in that class, in that sense.

Q. Is this a photograph of the inside of one of those transformers, 100-light transformers? (Photograph shown to witness.) A. It appears to be such a photograph.

Mr. BROOKS. I want to show that to the Commission and have it go in; that will speak for itself. And I would like to have it marked as an exhibit. And I trust no member of the Commission will ask me to explain it in its various parts. (The photograph was handed to the Commission.)

The CHAIRMAN. Now I was thinking that it was about the only thing in this case that has spoken for itself. Very well, we will have it marked, Mr. Brooks.

(The photograph referred to was marked by the stenographer "Ex. 149, E. L. D.")

Q. There are transformer losses, many of them, aren't there, whether the lights are on or off, going or not? A. I did not catch the first of that.

(The question was read by the stenographer.)

A. So long as the plant is running, there are.

Q. I didn't get the answer. A. So long as the plant is running, there are, yes.

Q. And that is the reason, is it not, why the alternating current plants shut down oftentimes during the day, to provide against the loss? A. I cannot say that it is.

Q. Well, in your opinion? A. It is not so, in my opinion.

Q. Does it effect a saving when they do shut down during the day? A. It would effect a small saving in some cases.

Q. Now the object of the cooling tower—I am going to hurry along with this—is to have your central station near the

centre of population, isn't it, like the one in Chicago and another in Duane Street,—the centre of the population that is served by the electrical output? A. Well, it is hard to put it that way.

Q. Well, then, if it is hard, I don't want to press it. Let it go. Do you know of any case where they have cooling towers where they can get water for condensation purposes otherwise? A. Not without great expense. It is a question of the cost.

Q. Now you say, in your direct, that this piece of land is situated, you say, two miles by pole-line radius,—by pole-line radius, it is two miles from City Hall. Did you know that that took you into the city of Northampton? A. I did not.

Q. Would that make any difference? A. It would not.

Q. You don't know anything about the number of small manufacturers in Holyoke, do you? A. Only to the extent to which I have testified.

Q. Somebody has told you something about it? A. Well, I go there a good deal.

Q. How many are there in the city of Holyoke? A. I do not know.

Q. Approximately? A. I do not know.

Q. And what do they manufacture with the power they do use? A. I do not know.

Q. Did you know—were you informed—that the Holyoke Water Power Company had not endeavored to extend its market for electrical power for motors or for incandescent lighting? A. I was not so informed.

Mr. BROOKS. That is all.

Mr. MATTHEWS. Mr. Warner, there was something you were going to send us in the form of a tabulation, you remember.

The WITNESS. Yes, sir.

The CHAIRMAN. Are you through, gentlemen, with this witness?

Mr. BROOKS. I am.

The CHAIRMAN. Now this other witness, I suppose, could be cross examined. I think, gentlemen, you had better go on with the cross examination of this other witness.

Mr. BROOKS. He is not open to cross examination yet.
Mr. GREEN. I am ready to put him on.

The table which counsel for the City had requested the witness to prepare was subsequently submitted by him and is as follows:—

**MEASURED WATER FOR RUNNING PLANT SUNDAYS AND
HOLIDAYS DURING THE YEAR, EXCEPT ONE HALF SUN-
DAY DAYLIGHT.**

I have already shown that furnishing of water without extra charge during these times would save per annum, coal costing at \$3.75 per ton	\$1,125.00
This is based on an estimate that the extra water furnished would be used to develop 84,156 K. W. hours per annum. I estimate that this would be equivalent at the water wheel shafts to 6,850 H. P. days per annum, twenty-four hour basis. The \$1,500 per annum mill power rate is equivalent to .0754 per H. P. day. The extra power required would therefore cost at this rate . . .	516.00
Net saving by use of measured water instead of coal	<u>\$609.00</u>
This net saving capitalized at the fixed charge and interest rate for the water plant, namely, 11.86%, amounts to \$5,140. This represents the increased value of the water plant under these terms.	
The fair market value of the plant, heretofore determined under Schedule T, is	\$50,000.00
Add	5,140.00
Total fair market value under modified conditions	<u>\$55,140.00</u>

R. L. WARNER.

FIFTIETH HEARING.

BOSTON, Thursday, Dec. 20, 1900.

The Commission met at the Court House at 10 A.M.

WILLIAM H. BLOOD, JR., *sworn*.

Direct examination by Mr. GREEN.

Q. What is your name? A. William Henry Blood, Jr.

Q. Where do you live, Mr. Blood? A. I live in Wellesley.

Q. Wellesley, Mass.? A. Yes, sir.

Q. What is your business, Mr. Blood? A. I am an electrical engineer.

Q. Are you a graduate of some institution? A. No, sir.

Q. Did you attend any institution? A. I took a four years' course in electrical engineering at the Institute of Technology, devoting my last year in particular to electrical matters instead of mechanical, and did not work for a degree.

Q. You did not work for a degree? A. No, sir.

Q. When did you finish your work at the Massachusetts Institute of Technology? A. 1888.

Q. After completing your work at the Institute of Technology what business did you follow and where were you engaged? A. I was a short time at the Mather Electric Company, at Manchester, Conn., and while with them my work consisted principally in testing dynamos and motors for efficiency—some calibrating of instruments.

Q. What then did you do? A. I then went with the Thomson-Houston Company at Lynn and acted in various capacities there, finally leaving them in charge of one department there. In that department, I was responsible for the assembling and testing of the railway motors, the stationary motors, the alternating current dynamos and transformers.

Q. How long were you with the Thomson-Houston Company? A. Something over two years.

Q. And after leaving their employment what did you do? A. I went to Minneapolis and opened for them, for the Northwest Thomson-Houston Company, a repair shop, attending to the repairs of the Northwestern territory, and acted as manager of their repair department.

Q. How long were you there? A. Something about a year, I think.

Q. After that what did you do? A. I went to Kansas City and went into business for myself as a contracting engineer, and also did some electrical engineering.

Q. How long were you engaged in contracting and engineering on your own account? A. Between five and six years.

Q. Then what did you do? A. I then came to Boston and took a position as superintendent for L. A. Chase & Co., who are manufacturers of electrical specialties and deal in second-hand motors and dynamos, and do general repair work and some construction work.

Q. After leaving their employ? A. I took a position with Stone & Webster.

Q. Of this city? A. Yes, sir.

Q. You have been with Stone & Webster now about two years? A. Yes, sir.

Q. What is your position with Stone & Webster? A. I am an electrical engineer.

The CHAIRMAN. What is Stone & Webster's business?

Q. What is Stone & Webster's business?

The CHAIRMAN. I want to get it on the record.

Mr. GREEN. Yes. I was going to take up the nature of his business with them rather more in detail, but, generally, what is the business of Stone & Webster?

A. Stone & Webster are termed electrical engineers, and I think they are engineers in the broadest sense. They take up the question of drawing plans and specifications for all kinds of electrical properties. They make expert examinations of various properties, both electric light, railway and anything else electrical, and they also have charge of the operation of a number of electric light and street railway properties.

Q. Whether or not in your employment with them you have been engaged in their general business? A. I have, yes, sir.

Q. And are familiar with the plants which they operate? A. To a degree I am familiar with the plants that they operate. My work personally has been more along the other two lines, rather than in the operation of the plants.

Q. What two lines are those? A. That is the examination of existing plants with reports on them, and in the laying out and in the construction of new plants.

Q. Have you been manager yourself of any electric light companies? A. I have.

Q. Of what? A. I was manager of the electric light company at Joplin, Missouri, and at Nevada, Missouri.

Q. And have you had any financial interest in an electric company? A. I have.

Q. And where was that? A. In Red Oak, Iowa.

Q. You spoke of your work for Stone & Webster as an engineer. For Stone & Webster what plants have you constructed, or in the construction of what plants have you acted as electrical engineer? A. I have done considerable engineering in connection with the plant at Brockton, Mass.; at Lowell, Mass.; at Savannah, Ga.; at Tampa, Fla.

Q. By the way, referring to the two plants that you have managed, how were they run, by steam or by water? A. The plant at Nevada was run entirely by steam. The one at Joplin was run by water with a steam auxiliary.

Q. How is the station in Florida—that is Tampa, Fla., isn't it? A. Tampa, Fla., yes, sir.

Q. How is that run? A. That is run by water and with a steam auxiliary.

Q. Have you as a contractor built or sold complete plants? A. I have.

Q. And I don't know but built and sold, I should say. A. Well, in the sense of contractor I have sold—I have built them under contract.

Q. What complete plants have you built yourself? A. I don't know that I can name all of them by any means. I built one at Albany, Missouri; at Bethany, at Higginsville, Missouri; at Brunswick, Missouri; one at Athens, Ohio; at Ossawatimic, Kansas; one at Plattsburg, Missouri; and a large number of small plants in and about Kansas City.

Q. And in taking these contracts, how about figuring the cost and buying materials and directing the construction work, both steam and electric? A. I generally did all of the estimating on the contract; generally was on the ground and made the bid in person, and received the contract; generally ordered all of the material, and in some cases supervised the actual installation of it.

Mr. BROOKS. Did he state how long he had been connected with Stone & Webster?

Mr. GREEN. Two years.

Q. That is right, isn't it? A. Nearly two years.

Q. What experience, if any, have you had in connection with water plants or with power as applied to electric plants? A. My first experience was at the plant in Joplin, Missouri, where, crowded into a very short space of time, I got considerable experience with the operation by water. I also had some with the plant at Tampa, and have, in conjunction with hydraulic engineers, made one or two examinations of water power properties with a view of transmitting the power electrically.

Q. In connection with your work with Stone & Webster have you had to do with any water power adjuncts to an electric plant? A. I have.

Q. And in any of these plants was water power used? A. Yes, sir.

Q. Are you familiar with the prices paid for water power in the operation of electric plants? A. No, sir, I am not.

Q. Have you made an examination of the electric, steam and water plants of the Holyoke Water Power Company used in their electric lighting business? A. I have.

Q. And have you made this examination relative to forming an opinion of the value of this property? A. I did.

Q. And have you an opinion? A. I have such an opinion.

Q. What in your opinion was the fair market value of the steam and electric plant of the Holyoke Water Power Company used in their electric lighting business, in January, 1898?

Mr. GOULDING. I do not understand the question now involves any valuation of the water plant.

Mr. GREEN. Not now, no.

A. \$61,390.

Q. Does that include the land? A. It does not.

Q. Have you prepared a schedule setting out the details of that? A. I have.

Mr. GREEN. I offer these schedules in evidence.

Mr. BROOKS. I suppose our rights may be reserved, your Honors, on the question.

The CHAIRMAN. Oh, yes.

(Schedule of William H. Blood, Jr., introduced in evidence and marked "Exhibit 139, W. L. H.")

[EXHIBIT 139.]

HOLYOKE WATER POWER COMPANY, PETITIONER,

v.

CITY OF HOLYOKE.

Estimates by W. H. Blood, Jr., Boston, Mass.

[1]

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SUMMARY OF VALUES IN ALL CASES FOR PURPOSES OF
USE AS AN ELECTRIC PLANT.

(Exclusive of the land.)

- | | |
|--|----------|
| I. Fair market value of electric and steam plants of Holyoke Water Power Co. apart from water plant | \$61,390 |
| II. Fair market value of electric, steam, and water plants of Holyoke Water Power Co., assuming that the purchaser can draw up to 16 mill powers of water and pay at the rate of \$1,500 per mill power per annum measured as used | 150,848 |
| III. Fair market value of the electric, steam, and water plants of the Holyoke Water Power Co., assuming that the purchaser would have to pay \$72,500 down as bonus and \$24,000 per annum rental of mill power | No value |
| IV. Fair market value of the electric, steam, and water plants of the Holyoke Water Power Co., assuming that the purchaser would have to pay \$72,000 down as bonus and \$12,000 per annum rental for 8 mill power | No value |
| V. Fair market value of the electric, steam, and water plants of the Holyoke Water Power Co., assuming that the purchaser would have to pay \$36,000 down as bonus and \$12,000 per annum rental for 8 mill power | No value |

[1 2]

I have assumed (at the request of counsel) the quantities upon the schedules as furnished by the Company, and have made no attempt to verify these quantities, but have accepted them for the sake of comparison. All my estimates are based upon these quantities.

I have also assumed sufficient land for foundations, coal-bins, etc., and railroad facilities for unloading coal on the premises.

The *cost to replace new* the electric light and power plant, January, 1898, including water power machinery, buildings, steam and electric plant (exclusive of land), I estimate at (Schedules B and C, pp. 25 to 44) \$247,426.

[2 3]

I estimate that the value of the same, if *depreciated on account of age and condition only*, is (Schedules D and E, pp. 45 to 55) \$180,215.

If a purchaser acquired in January, 1898, the existing plant, he would have to make a number of changes in order to operate it economically.

In the first place, the dynamos are of a very old and inefficient style. There are a great many of them, and the number of different systems is excessive. In my opinion a purchaser would take out all of the dynamos and replace them with four 125-light arc machines and two 100-kw. alternating current machines. This change would necessitate extensive changes in switchboard, foundations, shafting, and belting.

The arc lamps now in use are of an old style, and are very unsatisfactory in their operation and in their maintenance. These should all be discarded, and new enclosed arcs used in their places.

By the addition of new dynamos as I have outlined, it would cause the discontinuance of the use of Edison 110-volt dynamos, the General Electric 120-kw. alternator, and the Edison power generator, and all of their extra armatures. This change would require a corresponding change on the outside wiring, cross-arms, poles, and transformers.

[3 4]

The extent of the remodelling of this plant would depend entirely upon the number of days which the city would be obliged to run by steam. If it were required to run by steam a large part of the time, an intelligent purchaser would doubtless have the engines compounded, and would put in a condensing plant. But, in view of the fact that the days when it would be necessary to operate by steam would probably average sixty, it does not seem to me that this latter expense would be advisable, particularly as at this time (January 1898) the use of direct connected engines and dynamos had come into quite general use; and, if the purchaser were looking ahead, he would see that it would be only a matter of time when it would be necessary to discard the present engines and put in direct connected units.

In my estimates whatever would be retained and used I have valued depreciated on account of age and condition only. Whatever I have considered not satisfactory to use I have assumed that it would be removed, and have valued it at its removal value or at the price which the purchaser would get for it as second-hand machinery, standing on the floor in the plant. The buildings are much larger than is necessary, and are unsuitable for a modern plant. I have depreciated them on this account, as well as for their age and condition. The summary and the details of the market value are as follows:

[I A 5]

SUMMARY OF MARKET VALUE.

ELECTRIC AND STEAM PLANTS.

Dynamos and armatures	\$3,100.00
Switchboards, switches, station instruments	500.00
Transformers	680.00
Arc lamps	660.00
Meters	610.00
Service details	600.00
Poles, mast arm, etc.	6,600.00
Wire	7,000.00
Cross-arms	1,000.00
Machinery in boiler-room	3,400.00

Piping for plant	\$2,560.00
Machinery in engine-room	9,645.00
" " basement	1,300.00
" " " 	700.00
" " " 	500.00
Material in store-room	180.00
Office in station	38.00
Tools	92.00
Station wiring	75.00
	<hr/>
	\$39,240.00

[2 A 6]

MARKET VALUE.

BUILDINGS.

Dynamo building	\$9,500.00
Steam-engine building	3,750.00
Boiler-house	2,750.00
Chimney	6,000.00
Coal-bin	100.00
Sewer	50.00
	<hr/>
	\$22,150.00

Total: Electric light plant	\$39,240.00
Buildings	22,150.00
	<hr/>
	\$61,390.00

[3 A 7]

DETAILS OF MARKET VALUE.

DYNAMOS AND ARMATURES.

The dynamos and armatures are very old style, inefficient and small-sized unit, and entirely unsuited for the work. I have estimated these at their second-hand value as they stand upon the floor.

1 16-lt. Schuyler arc dynamo, 16 lbs.	
4 25 " " " " 100 "	
8 30 " " " " 240 "	
1 40 " " " " 40 "	
7 50 " " " " 350 "	
746 lbs. @ \$1	\$746.00
2 500-lt. Edison incandescent dynamos @ \$250	500.00
1 2,000-lt. G. E. alt., 120 kw.	800.00
1 100-kw. 500-v. Edison generator	600.00
1 40-lt. arc armature	10.00
1 30-kw. Edison incandescent armature	80.00
1 100-kw. Edison 500-v. armature	200.00
1 exciter armature for alternator	40.00
1 7½-H.P. T. H. motor	125.00
	<hr/>
	\$3,101.00

[4 A 8]

SWITCHBOARDS, SWITCHES, AND STATION INSTRUMENTS.

These are almost all of them old style, and, while adapted for use with the old dynamos, are of practically no value with the new machines, and are simply worth their second-hand value.

1 20-circuit 20-machine arc switchboard	\$250.00
29 ammeters in station (no value).	
1 Whitney 10-ampere portable ammeter	10.00
2 voltmeters (1 T.H., 1 Edison)	45.00
1 portable voltmeter	20.00
6 pressure indicators (no value).	
19 Schuyler arc regulators (go with dynamos).	
2 Holtzer-Cabot controllers	50.00
7 switches	7.00
14 feeder fuse blocks	7.00
1 circuit breaker	10.00
43 lightning arresters	86.00
6 iron-clad equalizers (no value).	
6 rheostats (go with machines).	
2 ground detectors	10.00
1 station transformer	5.00
	<u>\$500.00</u>

TRANSFORMERS.

Are of good style, of standard manufacture, and are suitable for use as they are	<u>\$680.00</u>
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[5 A 9]

ARC LAMPS.

662 lamps, Schuyler, Waterhouse & Gamble, and Sperry, all in poor condition, and good only as second-hand material, @ \$1	<u>\$662.00</u>
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METERS.

The Edison meters are worthless. The T. H. wattmeters are of value, simply depreciated on account of age and condition (Schedule E, p. 3)	<u>\$610.00</u>
---	-----------------

SERVICE DETAILS.

The depreciated value of service details is about \$2,400. The arc hanger boards, spark arrester, and Brady cut-outs are of no value, and most of the rest can only be used to a very small extent, or it will practically all have to be rearranged (Schedule E, p. 3)	<u>\$600.00</u>
---	-----------------

The poles are not such as would be put in now (1898) in a plant of this size. They, however, may be used, but cannot be worth more than the depreciated value (Schedule E, p. 4) \$6,600.00

The heavy wire would be of little use except as scrap. The other wire would in many cases have to be rearranged (Schedule E, p. 4) \$7,000.00

The cross-arms and pins would necessarily be changed if new wire were furnished. Part would be used, and part would be of no value (Schedule E, p. 5)	\$1,000.00
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This could be used, but is worth only its depreciated value (Schedule E, p. 5) \$3,400.00

Piping is adequate for plant as now arranged, but has depreciated in value since it was put in (Schedule E, p. 5) \$2,560.00

The depreciated value of the engine is (Schedule E, p. 6) . . . \$9,645.00

Of the shafting, pulleys, and belting, only about one-quarter would be used, and that at depreciated value (Schedule E, pp. 6, 7, 8).

Shafting	\$1,300.00
Pulleys	700.00
Belts	500.00

Could all be used at its depreciated value (Schedule E, p. 8) . . . \$180.00

At its depreciated value (Schedule E, p. 8) **\$38.00**

At their depreciated value (Schedule E, pp. 9, 10) \$92.00

At the depreciated value (Schedule E, p. 10) \$75.00

[8 A 12]

DETAIL OF MARKET VALUE.

BUILDINGS.

The dynamo building, the steam-engine building, and the boiler-house, all are twice as large as are needed for present load or for considerable increase. The value for use is, therefore, not over one-half of their depreciated value.

Dynamo building (Schedule D, p. 1)	\$9,500.00
Steam-engine building (Schedule D, p. 1)	3,750.00
Boiler-house (Schedule D, p. 1)	2,750.00

The chimney, coal-bin, and sewer can all be used. The chimney is really much larger than necessary. The depreciated value is:—

Chimney (Schedule D, p. 1)	6,000.00
Coal-bin " " " "	100.00
Sewer " " " "	50.00
	<u>\$22,150.00</u>

[4 13]

I next considered what a *new plant*, using direct connected electric unit and compound condensing engines, built in accordance with good commercial practice, would cost; and I estimate this to be (Schedule F, pp. 1, 2) \$140,859.00

[5 14]

A new plant properly located, where water for condensing can be secured all the time—free of cost, should consist of two direct connected units of 300 kw. capacity each, driven by compound condensing engines. Such a plant would cost, as I have estimated, \$140,859, which is \$106,567 less than the present plant could be reproduced for.

No purchaser would pay more for an out-of-date, worn-out plant than for a new one of same size and consisting of all new and modern apparatus, so that the old plant as a plant cannot under any consideration be worth more to a purchaser than \$140,859.

The only possible advantage of the old plant is that it is ready to do business the moment it is bought, while the new plant would require about six months to build. This could not exceed \$10,000, which is one-half the amount it is claimed are the net earnings per year.

The fixed charges on the difference in the investment of the old and new plant are as follows:—

Interest,	5%
Depreciation,	3
Taxes,	1
Insurance,	$\frac{1}{2}$
Repairs,	2
<hr/>	
11 $\frac{1}{2}$ % on \$106,567 = \$12,255.	

[6 15]

Now, Mr. Horatio A. Foster claims (Testimony, vol. iv. p. 22) that the cost of labor at present (1898) upon the combined steam and water power plant is as follows:—

1 dynamo man @ \$20 week	\$1,040.00
1 dynamo man @ \$16 week	832.00
1 engineer @ \$20 week	1,040.00
2 oilers @ \$12 week	1,248.00
1 engineer, 48 days @ \$3 day	144.00
1 fireman, 48 days @ \$2 day	96.00
	<hr/>
	\$4,400.00
Less part of engineer's time	750.00
	<hr/>
	\$3,650.00
	<hr/>

The labor to operate the modern plant would cost:—

2 engineers @ \$20	\$2,080.00
2 firemen @ \$14	2,184.00
1 oiler @ \$12	624.00
	<hr/>
	\$4,888.00
	<hr/>

I assume 190 H.P. per hour as the average load from estimates made by Mr. C. T. Main.

Now, I consider that the new plant is run 365 days per year and 24 hours per day, and that the coal consumption is 2.5 lbs. per H.P. per hour.

[7 16]

Figuring on this basis, there will be required 1,857 tons of coal, and, at \$4.05 per ton (the price given us by counsel), the yearly cost of \$7,520.

The new plant would cost to run in labor \$1,238 more than the old one, and the coal used in the new one would cost per

year \$7,520, or a total of \$8,758; but, as this is less than \$12,255, the fixed charges upon the extra investment of the old plant above the new one (on the basis of the reproductive cost), it proves that the purchaser could better afford to put in a new plant than to pay anything for the old plant in excess of what the new one would cost.

In the above discussion I have left out of account the amount that could be saved in labor and in carbons by the use of enclosed arc lamps, and have simply considered the station expense.

I have also neglected the item of coal used upon the old plant on restricted days, amounting to, according to Mr. H. A. Foster, \$1,663, which would only show up to the greater disadvantage of the Water Power Company.

I have further neglected the difference in the investment in the land, which would be a considerable amount.

[8 17]

The *new plant, as laid out by me*, is as follows (no testimony has been given as to the actual output of the dynamos or a load curve of the station, but, according to figures made by Mr. Main, the maximum load at the wheel shaft is 536 H.P.).

Put in two 300-kw. units in a new plant, and either one will be large enough to run the entire load.

These generators should be of the alternating current type, and from them all the customers that are now supplied could be handled.

The engines should be compound condensing, of sufficient size to operate these dynamos easily with an overload of at least 25%.

There should be boilers of sufficient capacity so that with the maximum load there shall be at least one idle boiler.

The building should be large enough to permit of adding one extra unit of same size of those installed, and with sufficient room in the boiler-room for extra boilers of proportional capacity.

[9 18]

I estimate the *cost to operate the new plant* as follows. I omit superintendents, book-keepers, etc., as common to all plants.

It is understood that the plant should be located upon the shore of the river or elsewhere where water for *condensing and for boiler feed could be procured without expense.*

FUEL.

1,857 tons @ \$4.05	\$7,520.00
-------------------------------	------------

LABOR.

2 engineers @ \$20 week	\$2,080.00	
3 firemen @ \$14 week	2,184.00	
1 oiler @ \$12 week	624.00	\$4,888.00
3 wire men @ \$60 month	\$2,160.00	
1 trimmer @ \$50 month	600.00	
1 helper @ \$50 month	600.00	
	<u>3,360.00</u>	8,248.00

SUPPLIES, REPAIRS, AND MISCELLANEOUS.

Lubricants and waste	\$300.00	
Globes, carbons, and lamps	1,000.00	
Miscellaneous supplies	150.00	
Miscellaneous repairs	2,800.00	
Stable expense	<u>500.00</u>	4,750.00

FIXED CHARGES (*exclusive of land*).

Interest	5%	
Depreciation	3	
Taxes	1	
Insurance	<u>$\frac{1}{2}$</u>	
	9 $\frac{1}{2}$ % on \$140,859	13,381.00
Cost of new plant		<u><u>\$33,899.00</u></u>

[10 19]

The *cost to operate the old plant entirely by steam*, it being assured that the city will *buy* only the *steam and electric plant*, but *not the water power* machinery.

I assume for comparison that it is running, as now arranged, non-condensing, but that it runs 24 hours per day and 365 days per year, 190 H.P., and uses 3.39 lbs. coal per H.P. hour, and 34.5 lbs. water per H.P. hour (Foster, vol. iv. p. 22), and that the labor is as they estimate it. Then we have the following:—

FUEL.

2,514 tons @ \$4.05	<u><u>\$10,192.00</u></u>
-------------------------------	---------------------------

LABOR.

2 oilers @ \$12 per week	\$1,248.00	
1 dynamo man @ \$20 per week	1,040.00	
1 dynamo man @ \$16	832.00	
1 engineer @ \$20	1,040.00	
1 engineer @ \$18	936.00	
2 firemen @ \$14	1,456.00	
Labor on repairs	600.00	
	<u>\$7,152.00</u>	
Distribution labor (9 months = \$4,672)	6,228.00	<u>\$13,380.00</u>

SUPPLIES, REPAIRS, AND MISCELLANEOUS.

Feed water	\$400.00	
Lubricants, etc.	400.00	
Miscellaneous	150.00	
Carbons, globes, and lamps (9 months = \$1,351)	1,800.00	
Stable expense	600.00	
Repairs	3,700.00	<u>\$30,622.00</u>

[11 20]

FIXED CHARGES (*exclusive of land*).

Interest	5%	
Depreciation	3	
Taxes	1	
Insurance	<u>$\frac{1}{2}$</u>	
	9 $\frac{1}{2}$ %	
9 $\frac{1}{2}$ % on \$186,533, reproduction cost of steam and electric plant		17,720.00
Total cost to operate old plant by steam, if water power is not bought		<u>\$48,342.00</u>
Operating expenses, <i>new plant</i>		\$20,518.00
Fixed charges, <i>new plant</i>		13,381.00
Total		<u>\$33,899.00</u>
Operating expenses, old plant (omitting fixed charges)		30,622.00
Difference		<u>\$3,277.00</u>

The above showing that, if the old plant were running under similar conditions as the new plant, the total *fixed charges* on the old plant should not be more than this difference, or \$3,277; but, as the *depreciation alone* on the new plant (3% on \$140,859) is \$4,225, which is more than the total fixed charges should be on the old plant, it shows that the plant cannot be operated as it is. \$3,277 capitalized at 9 $\frac{1}{2}$ %, the fixed charge rate, is \$34,494,

which is all that could be paid for the plant on the basis of operating expenses, and proves that the plant must be remodelled, as I assumed at the outset.

[12 21]

In my judgment, if an engineer were building a new plant in January, 1898, he would have put in one system of dynamos, and would run arc lights, incandescent lights, and motors from the same circuit. If, however, he were remodelling the old plant on that same date, he would probably have put in four 125-light arc dynamos and two 2 or 3-phase alternating current dynamos of 100-kw. capacity each, together with switchboards and other necessary changes in shafting, belting, new poles, transformers, and outside wiring.

Assuming the market value as follows (Schedule A) :—

Electric light plant (p. 1)	\$39,240.00	
Buildings (p. 2)	22,150.00	\$61,390.00
<hr/>		
To reconstruct and put the plant in condition to run more economically than at present, but not as economically as a new plant, would cost (Schedule G)		43,010.00
<hr/>		
The sum of the above, representing what would have to be paid out, equals		\$104,400.00
<hr/>		

To find out what could be paid for the water power plant, assuming that the city would pay \$1,500 per M.P. per year for measured power.

[13 22]

The cost to operate the remodelled plant by water 303 days per year, by steam 62 days per year (assuming, for the present, no value for the water power plant) :—

FIXED CHARGES.

At 9½% on \$104,400	\$9,918.00
-------------------------------	------------

OPERATING EXPENSES.

Labor in station (H. A. Foster, vol. iv. p. 22) :

1 dynamo man @ \$20	\$1,040.00	
1 dynamo man @ \$16	832.00	
1 engineer @ \$20	1,040.00	
2 oilers @ \$12	1,248.00	
1 engineer, 62 days, @ \$3	186.00	
1 fireman, 62 days, @ \$2	124.00	\$4,470.00
<hr/>		

SUPPLIES, REPAIRS, AND MISCELLANEOUS.

Lubricants	\$500.00	
Feed water	65.00	
Miscellaneous supplies	150.00	
Repairs	<u>2,088.00</u>	2,803.00

FUEL.

$190 \times 3.39 \times 24 \times 4.05 \times 62$		1,784.00
2240		
3 M.P. @ \$1,500 = \$4,500 (less $\frac{1}{100} \times \$4,500$)		4,130.00
		<u>\$23,105.00</u>

[14 23]

Cost to operate by steam the remodelled plant 365 days per year :—

FIXED CHARGES.

At $9\frac{1}{4}\%$ on \$104,400	\$9,918.00
--	------------

OPERATING EXPENSE (*Foster*).

Labor: 2 oilers @ \$12 per week	\$1,248.00	
1 dynamo man @ \$20 per week	1,040.00	
1 dynamo man @ \$16 per week	832.00	
1 engineer @ \$20 per week	1,040.00	
1 engineer @ \$18 per week	936.00	
2 firemen @ \$14 per week	<u>1,456.00</u>	6,552.00

SUPPLIES, REPAIRS, AND MISCELLANEOUS.

Lubricants, etc.	\$400.00	
Feed water	400.00	
Miscellaneous supplies	150.00	
Repairs	<u>2,088.00</u>	3,038.00

FUEL.

$190 \times 3.39 \times 24 \times 4.05 \times 365 =$		10,201.00
2240		
		<u>\$30,709.00</u>

Total cost to operate by steam (simple engine) \$30,709.00

Total cost to operate by water and steam auxiliary 23,105.00

\$7,604.00

Which should represent the fixed charges at $8\frac{1}{2}\%$; or, in other words, \$7,604, capitalized at $8\frac{1}{2}\%$, equals \$89,458.

[15. 24]

This \$89,458 is the amount that could be paid for the water

power plant, if the city were allowed to pay \$1,500 per M.P. measured water, and time operated by steam = 62 days, it also being assumed that it costs the city \$61,390 + \$43,010 = \$104,400 for the remodelled plant. -

Now, as a matter of fact, the remodelled plant would not operate nearly as well as a new one, for there is a loss in the shafting and belting (varying from 5% to 30%, under different conditions). The engines are not compounded or condensing, which would make a difference in coal consumption of 3.39 lbs. per H.P. hour, as against 2.5 lbs. per H.P. hour. The efficiency of the dynamos would not be as great as in a new plant. There are also a few other minor ways in which it would not be as economical to operate as a new plant.

The city could not afford to pay for operation of the plant by water more than it would cost operating by steam, which equals \$30,709. The cost of operating by water 303 and by steam 62 days, if nothing is paid for *water power*, equals \$18,975. The difference between these (\$30,709 — \$18,975) equals \$11,734, and this amount capitalized at 8½% is \$138,047, which is the amount that could be paid for the *water power plant* if *water power* were furnished *free*.

On the other hand, if the *water power plant* were furnished *free*, the city could afford to pay for the water power (three mill power 303 days) \$4,130 + \$7,604 = \$11,734. These are the two limiting cases, and any arrangements between them could easily be figured out.

[B 25]

COST TO REPRODUCE NEW, ITEM BY ITEM, ESTIMATE BASED
UPON QUANTITIES AS FURNISHED BY COMPANY.

MACHINERY AND BUILDINGS.

Headgate	\$4,533.40
Headgate machinery	651.25
Wooden fender	648.00
Wheelpit and tailrace	44,883.66
Wheel-house	1,564.50
Tunnels	1,725.83
Dynamo building	24,351.88
Steam-engine building	10,300.72

Boiler-house	\$6,787.44
Chimney	7,195.29
Coal-bin	182.00
Sewer	127.87
	<hr/>
	\$102,951.84
Engineering and incidentals, 10%	10,295.18
	<hr/>
	\$113,247.02
Six months' interest @ 5%	2,831.17
	<hr/>
	\$116,078.17
	<hr/>

[2 B 26]

HEADGATE.

Excavating earth, 1,058 yds.	\$370.30
Canal wall taken down, 262 cu. yds.	131.00
Gravel puddling, 207 cu. yds.	82.80
Back filling earth, 744 cu. yds.	74.40
Canal wall rebuilt dry, pointed 12 inches with cement mortar, 71 cu. yds.	177.50
Rubble masonry, cement mortar, 154 cu. yds.	1,078.00
Labor, including spikes, on 25,000 ft. lumber	100.00
Brickwork, cement mortar, 4,978 brick	60.00
Hemlock sheet piling, 8,703 ft. B. M.	160.00
Hemlock timber mud sills, 3,907 ft. B. M.	64.00
3-in. hemlock plank, 3,291 ft. B. M.	60.00
2-in. white pine plank, 1,094 ft. B. M.	44.00
Southern pine timber, 4,560 ft. B. M.	112.00
Iron rack front of headgate	600.00
Wooden gates, Southern pine, 1,953 ft. B. M.	50.00
Iron rods and washers, 175 lbs.	7.00
2 iron penstocks, 10 ft. diam., 36 ft. 6 in. long	1,300.00
4 iron rings, 32 bolts	52.40
2 vent pipes, 6 in. diam., 7 ft. long, 333 lbs.	10.00
	<hr/>
	\$4,533.40
	<hr/>

HEADGATE MACHINERY.

4 shafts, 2 $\frac{1}{2}$ in. diam., 16 ft. 10 in. long, with boxes and hangers	\$130.75
2 shafts, 1 $\frac{1}{2}$ in. diam., 11 ft. 3 in. long, with boxes and hangers	42.40
8 sets racks and pinions, racks 10 ft. 9 in. long	300.00
2 wicket gates, 18 in. x 16 in.	10.00
16 iron rolls, 4 in. diam., 3 in. long, with stands and guides	35.00
4 sets worm gears	50.00
4 hand wheels, 24 in. diam.	20.00
2 shafts, 1 $\frac{1}{2}$ in. diam., 4 ft. 9 in. long, with boxes	13.10
2 stands bolted to stonework	50.00
	<hr/>
	\$651.25
	<hr/>

WOODEN FENDERS.

Southern pine, 1,146 ft. B. M.	\$30.00
Spruce, 316 ft. B. M.	8.00
2 spruce plank, 507 ft. B. M.	10.00
Coffer dam, 507 ft. B. M.	600.00
	<hr/>
	\$648.00
	<hr/>

[3 B 27]

WHEELPIT AND TAILRACE.

Excavating earth, 32,333 cu. yds.	\$10,334.56
Canal wall taken down dry, 343 cu. yds.	171.50
Gravel puddling, 1,258 cu. yds.	503.20
Stone filling grouted, 50 cu. yds.	350.00
Back filling earth, 18,389 cu. yds.	1,838.90
Canal wall relaid dry, pointed 12 in., 105 cu. yds.	262.50
Rubble masonry, cement mortar wheelpit, 1,022 cu. yds.	7,154.00
Rubble masonry, cement mortar tailrace, 912 cu. yds.	6,384.00
Cut granite masonry, 7½ cu. yds.	135.00
Brickwork cement mortar wheelpit, 99,851 brick	1,200.00
Brickwork cement mortar tailrace, 925,684 brick	11,112.00
Hemlock timber mud sills, 61,075 ft. B. M.	976.00
4-in. hemlock plank, 96,720 ft. B. M.	1,740.00
2-in. pine plank, 36,017 ft. B. M.	1,440.00
Spruce sheet piling, 22,967 ft. B. M.	414.00
Labor and spikes on 216,880 ft. B. M.	868.00
	<hr/>
	\$44,883.66
	<hr/>

WHEEL-HOUSE.

Brickwork (lime mortar), 65,596 brick	\$660.00
Granite sills, 26.39 cu. ft.	65.00
Southern pine timber, 8,331 ft. B. M.	200.00
2-ft. Southern pine plank, 3,208 ft. B. M.	85.00
3-in. Southern pine plank, 3,977 ft. B. M.	100.00
Labor and spikes on 15,500 ft. B. M.	62.00
1 single outside door and frame	8.00
1 double outside door and frame	11.00
6 windows, box frames, double sash	30.00
5 windows, plank frames, single sash	20.00
Zinc flashing, 182 sq. ft.	16.38
Cast-iron wall plates, 244 lbs.	4.10
Bolts, nuts, and washers, 224 lbs.	8.96
243 ft. 1-in. pipe railing and fittings	20.00
163 ft. 1-in. steam pipe and fittings	12.00
20 ft. ½-in. steam pipe and fittings	1.25
1 condenser	10.00
Gravel roof, 2,065 sq. ft.	123.90

[4 B 28]

1 1-in. Jenkins valve	\$1.12
1 1½-in. Jenkins valve	2.20
14 ft. ¾-in. gas pipe and fittings	1.00
71 ft. ¾-in. gas pipe and fittings	3.00
3 ft. ¾-in. gas pipe and fittings . . . . .	.09
3 single gas burners	1.50
Whitening walls, 1,828 sq. ft.	23.00
Painting wheel cases, yokes, iron girders, door frames, doors, windows and frames, and pipe railing	25.00
Labor, \$50; hardware, \$20	70.00
	<hr/>
	\$1,564.50

TUNNELS.

Excavating earth, 584 cu. yds.	\$204.40
Back filling, 526 cu. yds.	52.60
9-in. flaggers, 597 sq. ft.	107.46
Brickwork and cement mortar, 86,265 brick	1,035.00
Concrete, 656 sq. ft.	98.40
Southern pine timber, 107 ft. B. M.	2.50
Cast iron plates, 3,438 lbs.	85.95
40 bolts, with heads and nuts, 467 lbs.	18.68
1 Jenkins 2-in. valve	3.20
140 ft. 2-in. steam pipe and fittings	17.64
Miscellaneous	100.00
	<hr/>
	\$1,725.83

DYNAMO BUILDING.

Excavating earth, 5,041 cu. yds.	\$1,764.35
Back filling, 1,692 cu. yds.	169.20
6-in. flaggers, 3,396 sq. ft. }	708.44
9-in. flaggers, 512 sq. ft. }	
Concrete, 5,288 sq. ft.	793.20
Brickwork, cement mortar, 360,601 brick	4,326.00
Brickwork, lime mortar, 272,412 brick	2,725.00
Brickwork, special quarter round, 3,800 brick	48.00
Cut stone N. R. Blue, 190 cu. ft. }	510.00
Cut stone N. R. Blue, 1,455 cu. ft. }	

[5 B 29]

Rubble masonry cement, 432 cu. yds.	3,024.00
5 granite door sills } 165 cu. ft.	206.23
99 granite window sills }	
Southern pine timber, 40,211 ft. B. M.	1,000.00
4-in. spruce plank, 33,683 ft. B. M.	603.00
3-in. spruce plank, 25,260 ft. B. M.	455.00
3-in. native pine plank, 27,995 ft. B. M.	616.00
¾-in. Southern pine sheathing finished, 2,685 ft. B. M.	78.00

$\frac{1}{2}$ -in. native pine sheathing finished, 10,112 ft. B. M.	\$350.00
3 wooden platforms	45.00
83 windows, box frames, double sash	415.00
19 windows, plank frames, double sash	76.00
2 outside double doors and frames	22.00
3 outside single doors and frames	24.00
11 inside single doors and frames	55.00
Cast-iron wall-plates, 35,710 lbs.	892.75
11 wrought-iron roof trusses, 49,478 lbs.	1,979.12
4 wrought-iron I beams, 2,534 lbs.	101.36
Wrought-iron brackets, 543 lbs.	21.72
Bolts and washers, 13,719 lbs.	548.76
Gravel roof, 7,465 sq. ft.	447.90
Zinc flashing, 837 sq. ft.	75.33
63 ft. 3-in. steam pipe and fittings	16.38
11 ft. 2 $\frac{1}{2}$ -in. " " " "	2.09
18 ft. 1 $\frac{1}{2}$ -in. " " " "	1.80
48 ft. 1 $\frac{1}{2}$ -in. " " " "	3.36
Labor and spikes on 158,866 ft. B. M.	636.00
3,055 ft. 1-in. pipe and fittings	168.00
39 " $\frac{3}{4}$ -in. " " " "	2.25
22 " $\frac{1}{2}$ -in. " " " "	1.95
1 1 $\frac{1}{2}$ -in., 5 1-in., 1 $\frac{1}{2}$ -in. Jenkins valve	5.60
1 1 $\frac{1}{2}$ -in. Globe valve	1.56
6 $\frac{3}{4}$ -in. check valve	4.56
1 radiator, 24 1-in. pipes, 30 in. high	10.00
158 ft. 1 $\frac{1}{2}$ -in. gas pipe and fittings	11.00
285 " 1-in. " " " "	14.25
235 " $\frac{3}{4}$ -in. " " " "	11.95
245 " $\frac{1}{2}$ -in. " " " "	9.80

[6 B 30]

35 " $\frac{1}{2}$ -in. " " " "	1.05
5 burners	2.50
100 ft. $\frac{3}{4}$ -in. galvanized water pipe and fittings	7.00
120 " 1-in. " " " " " "	10.80
47 " $\frac{1}{2}$ -in. " " " " " "	2.80
22 " 2 $\frac{1}{2}$ -in. standpipe and fittings	4.20
24 " 2-in. " " " "	3.36
1 $\frac{3}{4}$ -in., 1 $\frac{1}{2}$ -in., 1 1-in., 5 2-in. Jenkins valve	21.38
300 ft. 1 $\frac{1}{2}$ -in. fire hose	54.00
5 16-in. brass nozzles	5.00
65 ft. 2-in. C. I. soil pipe and fittings	11.70
77 ft. 4-in. C. I. soil pipe and fittings	18.48
5 2-in. traps	1.50
154 ft. 4-in. galvanized iron leader pipes	21.00
2 cast-iron sinks 21 in. x 42 in. x 6 in.	8.00
2 $\frac{1}{2}$ -in. hose connection faucets . . . . .	.80

1 $\frac{1}{2}$ -in. plain faucet	\$0.35
1 lead-lined water-closet tank, 7 in. x 2 in. x 18 in.	20.00
3 water-closets	22.50
1 wash-bowl	9.00
1 urinal	9.00
1 hydraulic elevator	350.00
1 traveller with chain falls	100.00
Whitening of walls, 3,770 sq. ft.	56.55
Painting	141.00
Hardware	109.00
Labor on windows, doors, steam, water, gas piping, and plumbing	380.00
	<hr/> <hr/>
	\$24,351.88

STEAM ENGINE BUILDING.

Excavating earth, 2,424 cu. yds.	\$848.40
Old stone wall taken down, 184 cu. yds.	92.00
Gravel puddling, 216 cu. yds.	86.40
Back filling, 356 cu. yds.	35.60
9-in. flaggers laid dry, 724 sq. ft.	368.10
10-in. flaggers laid dry, grouted cement, 1321 sq. ft. }	
Brickwork, cement mortar, 247,608 brick	2,970.00

[7 B 31]

Brickwork, lime mortar, 116,250 brick	1,162.00
Brickwork, special quarter round, 22,000 brick	25.00
Granite sills, 41 cu. ft.	82.00
Cut granite, with holes for engines, 380 cu. ft. }	1,026.00
Cut granite, with holes for engines, 133 cu. ft. }	
Southern pine timber, 11,481 ft. B. M.	275.00
3-in. spruce plank, 13,752 ft. B. M.	246.00
3-in. pine plank, 18,436 ft. B. M.	450.00
Southern pine, finished lumber, 1,761 ft. B. M.	60.00
1 $\frac{1}{2}$ -in. maple flooring, 5,157 ft. B. M.	200.00
1 outside platform	15.00
Labor and spikes on 50,587 ft. B. M.	202.00
18 windows, box frames, double sash	90.00
2 single outside doors, plank frame	16.00
1 double outside door, plank frame	11.00
C. I. wall plates, 6,765 lbs.	169.12
Bolts, 4,085 lbs.	163.40
8 roof trusses, 16,400 lbs.	656.00
48 squares slate	480.00
1,716 wire snow guards	137.28
Zinc flashing, 230 sq. ft.	20.70
39 ft. galv. gutters	5.46
65 ft. 4-in. galv. leader pipe	9.12
266 ft. 1-in. pipe railing and fittings	13.30
108 " 1-in. gas pipe " "	5.40

61 ft. $\frac{1}{2}$ -in. gas pipe and fittings	\$2.40
5 " $\frac{1}{2}$ -in. " " " " . . . . .	.15
5 burners	2.50
112 ft. 3-in. steam pipe and fittings	29.12
174 " 1-in. " " " "	8.70
1 3-in. gate valve and fittings	6.00
4 ft. $\frac{3}{4}$ -in. steam pipe and fittings . . . . .	.20
6 ft. 2 $\frac{1}{2}$ -in. " "	1.14
1 2-in. gate valve	3.00
2 condensers	20.00
1 1-in. check, 1 $\frac{3}{4}$ -in. check, 1 1-in. valve	3.00
1 $\frac{3}{4}$ -in. valve . . . . .	.60

[8 B 32]

100 ft. 1 $\frac{1}{2}$ -in. fire hose	18.00
2 ft. 16-in. brass nozzles	2.00
166 ft. 2-in. water pipe and fittings	23.24
92 ft. $\frac{3}{4}$ -in. " " " "	6.44
9 ft. 3 $\frac{1}{2}$ -in. " " " "	2.79
48 ft. 3-in. " " " "	12.48
72 ft. 3 $\frac{1}{2}$ -in. " " " "	13.68
1 2-in. Jenkins valve, 3 3 $\frac{1}{2}$ -in. gate	21.00
Hardware	29.00
Labor	125.00
Painting	50.00

\$10,300.72

BOILER HOUSE.

Excavation (earth), 742 cu. yds.	\$259.70
Gravel puddling, 174 cu. yds.	69.60
Back filling, 145 cu. yds.	14.50
9-in. flaggers, 558 sq. ft.	309.24
10-in. flaggers, boiler foundation, 1,160 sq. ft. }	
Brickwork, cement, 44,912 brick	540.00
" " boiler foundation, 13,400 brick	162.00
" lime mortar, 146,061 brick	1,460.00
" paving, 19,300 brick	174.00
42 ft. 16-in. cement coping	10.00
13 ft. granite sills } 21 cu. ft.	30.00
1 granite door sill }	
Southern pine timber, 1,277 ft. B. M.	28.00
3-in. native pine roof plank, 13,592 ft. B. M.	297.00
Pine finishing lumber, 5,141 ft. B. M.	200.00
Clapboards, 92 sq. ft.	3.60
9 iron roof trusses, 19,350 lbs.	774.00
Bolts, 153 lbs.	6.12
53 ft. 1-in. pipe railing and fittings	2.81
Smoke pipe, 3,071 lbs.	153.55

Hangers, 210 lbs.	\$8.40
Gravel roof, 2,878 sq. ft.	172.68
2 double outside doors and frames	22.00
1 single " " " "	8.00
1 inside turned door	10.00
2 iron door sills	6.00
4 iron side pieces	6.00
6 iron wall hangers for door	18.00

[9 B 33]

10 box frame double sash windows	50.00
16 windows, single sash	64.00
Labor and nails on 20,000 ft. B. M.	80.00
322 ft. 4-in. water pipe and fittings	212.52
15 " 2 $\frac{1}{2}$ -in. " " " "	6.75
38 " 2 $\frac{1}{2}$ -in. " " " "	12.60
45 " 2 $\frac{1}{2}$ -in. " " " "	10.41
188 " 2-in. " " " "	39.48
52 " 1 $\frac{1}{2}$ -in. " " " "	4.24
21 " 1 $\frac{1}{2}$ -in. " " " "	2.00
58 " 1-in. " " " "	2.90
90 " $\frac{3}{4}$ -in. " " " "	3.60
33 " $\frac{3}{8}$ -in. " " " "	1.34
Gate valves, 4 3-in., 1 2 $\frac{1}{2}$ -in., 1 2 $\frac{1}{2}$ -in., 1 4-in.	42.60
Check valves, 1 3-in., 1 2-in.	5.54
Jenkins valves, { 1 2 $\frac{1}{2}$ -in., 3 2-in., 6 1 $\frac{1}{2}$ -in., 2 1 $\frac{1}{2}$ -in. } { 4 1-in., 6 $\frac{3}{4}$ -in., 5 $\frac{3}{8}$ -in. }	43.00
2 faucets, 1 trap	3.00
16 ft. 1-in. gas pipe and fittings . . . . .	.88
102 " $\frac{3}{4}$ -in. " " " "	5.10
208 " $\frac{1}{2}$ -in. " " " "	8.32
11 " $\frac{1}{2}$ -in. " " " " . . . . .	.33
11 burners	5.50
30 ft. 3-in wrought-iron pipe	7.50
2 3-in. globe valve	6.86
8 ft. 14-in. steam pipe	18.90
83 " 12-in. " "	167.03
45 " 10-in. " "	70.87
33 " 8-in. " "	51.94
29 " 4-in. " "	7.63
1 14-in. ell, 1 14-in. tee, 10 12-in. ells, 2 12-in. tees } 4 10-in. ells, 2 8-in. ells, 5 4-in. ells, 1 14-in. tee }	266.55
12 ft. wrought-iron pipe 16 in.	35.85

[10 B 34]

Gate valves, 2 12-in., 2 10-in., 5 4-in.	198.40
1 12-in. ell, 1 12-in. tee	30.00
1 galvanized iron hood	120.00
1 sink, 36 in. x 20 in.	4.00

1 water closet	\$20.00
Felt pipe covering 740 sq. ft.	148.00
Labor on pipe, doors, and windows	200.00
Hardware, \$43; painting, \$42	85.00
	<u>\$6,787.44</u>

CHIMNEY.

Excavating earth, 1,261 cu. yds.	\$441.35
Gravel puddling, 135 cu. yds	54.00
Back filling, 945 cu. yds.	94.50
121 spruce piling, 12 in. diam., 20 ft. long	363.00
Flaggers, grouted, 766 sq. ft.	137.88
Stone rubble, grouted, 168 cu. yds.	1,176.00
Brickwork, 393,059 brick	4,716.00
Iron ash-door and frame, 500 lbs.	20.00
Ladder rungs, 576 lbs.	21.16
Anchor bolts, 85 lbs.	3.40
Iron caps, 4,800 lbs.	168.00
	<u>\$7,195.29</u>

COAL BIN.

Spruce timber, 2,500 ft. B. M.	\$40.00
3-in. spruce plank, 6,000 ft. B. M.	108.00
Labor and spikes on 8,500 ft. B. M.	34.00
	<u>\$182.00</u>

SEWER.

511 ft. 6-in. vit. pipe	\$53.65
56 ft. 3-in. vit. pipe	3.12
2 6-in. traps	2.44
2 quarter bends	2.20
1 6-in. Y, 1 3-in. x 6-in. Y	1.46
3 catch basins	15.00
Labor and cement	50.00
	<u>\$127.87</u>

[C 35]

COST TO REPRODUCE NEW, ITEM BY ITEM, ESTIMATE BASED
UPON QUANTITIES AS FURNISHED BY COMPANY.

SUMMARY.

Page.	Cost.	Labor and Freight.
1 Dynamos and armatures	\$21,785.00	\$888.00
1 Switchboard, switches, and station instruments	2,392.00	192.00
2 Transformers	645.00	40.00
2 Arc lamps	10,302.50	2,053.00

2	Meters	\$705.50	\$99.00
2	Service details	745.50	1,961.50
3	Poles, mast arms, etc.	8,328.50	2,082.00
3	Wire	9,468.95	3,144.90
4	Cross-arms, pins, insulators, etc.	596.63	1,153.00
4	Machinery, etc., in boiler room	5,623.00	80.00
4	Piping for entire plant	3,200.00	
5	Machinery in engine room	12,057.00	
5	" " wheel house	12,461.55	
5	" " basement (shafting)	7,794.12	645.00
6	" " " (pulleys)	2,770.16	675.00
7	" " " (belts)	3,692.90	200.00
7	Material in store room	286.00	23.00
7	Office in station	81.00	
9	Tools	195.92	
9	Station wiring	127.50	
		\$103,258.73	\$13,236.40
		13,236.40	
		\$116,495.13	
Engineering and incidentals, 10%		11,649.51	
		\$128,144.64	
Six months' interest @ 5% per annum		3,203.61	
		\$131,348.25	

[I C 36]

DYNAMOS AND ARMATURES.

		<i>Value.</i>	<i>Labor and Freight.</i>
1	16-lt. Schuyler arc dynamos 16		
4	25-lt. " " " 100		
8	30-lt. " " " 240		
1	40-lt. " " " 40		
7	50-lt. " " " 350		
746 @ \$20		\$14,920.00	\$630.00
2	500-lt. Edison inc. dynamos	1,760.00	100.00
1	2000-lt. G. E. alt., 120 kw.	1,600.00	60.00
1	100-kw. 500-v. Edison generator	2,000.00	50.00
1	40-arc armature	300.00	10.00
1	30-kw. Edison inc. armature	240.00	10.00
1	100-kw. Edison 500-v. power armature	675.00	10.00
1	exciter armature for alternator	75.00	3.00
1	7½ H.P. T. H. motor	215.00	15.00
		\$21,785.00	\$888.00

SWITCHBOARDS, SWITCHES, AND STATION INSTRUMENTS.

1 20-circuit machine arc switchboard	\$875.00	\$25.00
29 ammeters in station, 20 Schuyler @ \$10, 6 Edison @ \$12, 3 T. H. @ \$15	317.00	50.00
1 Whitney 10-ampere portable	26.00	
2 voltmeters in station, 1 T. H. @ \$25, 1 Edison @ \$20	45.00	3.00
1 portable voltmeter	35.00	
6 pressure indicators @ \$30	180.00	10.00
19 Schuyler arc regulators (go with dynamos), 2 Holtzer-Cabot controllers	200.00	15.00
7 switches	70.00	14.00
14 feeder fuse blocks: 2 G. E. 100 amp. @ \$5, 12 Ed. plug @ \$1	22.00	14.00
1 circuit breaker, 150-amp. T. H.	35.00	2.00
43 lightning arresters @ \$10	430.00	43.00
6 iron-clad equalizers: 2 100-amp. @ \$50, 2 50-amp. @ \$40, 2 25-amp. @ \$30	120.00	12.00
6 rheostats (go with machines), 2 ground detectors, 1 Ed. lamp @ \$2, 1 T. H. transf. @ \$20	22.00	2.00
1 station transformer	15.00	2.00
	<u>\$2,392.00</u>	<u>\$192.00</u>

[2 C 37]

TRANSFORMERS.

7 type F. 150-lt. T. H. transformers @ \$80	\$560.00	\$35.00
1 " H. 150-lt. " " "	85.00	5.00
	<u>\$645.00</u>	<u>\$40.00</u>

ARC LAMPS.

297 Schuyler double arc lamps @ \$17.50	\$5,197.50	\$594.00
285 " single " " " \$15	4,275.00	1,425.00
73 " " " " " \$10 (repair shop)	730.00	20.00
6 Waterhouse & Gamble arc lamps @ \$15	90.00	12.00
1 Sperry arc lamp @ \$10	10.00	2.00
	<u>\$10,302.50</u>	<u>\$2,053.00</u>

METERS.

2 No. 2 Edison meters complete @ \$8.50	\$17.00	\$6.00
2 " 4 " " " " 8.50	17.00	6.00
3 " 8 " " " " 13.00	39.00	9.00
2 Class 5 T. H. wattmeters " 17.50	35.00	6.00
11 " 7½ " " " " 17.50	192.50	33.00
3 " 15 " " " " 25.00	75.00	9.00
6 " 25 " " " " 30.00	180.00	18.00
4 " 50 " " " " 37.50	150.00	12.00
	<u>\$705.50</u>	<u>\$99.00</u>

SERVICE DETAILS.

190 arc hanger boards in stores @ \$1	\$190.00	\$190.00
76 switches on power connections @ \$1	76.00	142.00
163 porcelain cut-outs, inc. connections @ 50c.	81.50	81.50
152 " " power " " 75c.	114.00	76.00
112 Brady cut-outs, arc connections " \$2	224.00	112.00
80 spark arresters @ 75c.	60.00	10.00
270 service connections (83 motors, 149 inc., 38 arc) @ \$5,		1,350.00
	<u>\$745.50</u>	<u>\$1,961.50</u>

[3 C 38]

POLES, MAST-ARMS, ETC.

273 iron poles, set @ \$8	\$2,184.00	\$273.00
194 octagonal chestnut and Southern pine poles with hoods, hanger boards, cross-heads, and steps, set @ 14c.	2,716.00	194.00
15 square chestnut and Southern pine poles with hoods, hanger boards, cross-heads, and steps, set @ 14c.	210.00	15.00
3 round chestnut and Southern pine poles with hoods, hanger boards, cross-heads, and steps, set @ 10c.	30.00	3.00
43 mast, arm-poles with hoods, hanger boards, and cables, complete, set @ 20c.	860.00	43.00
262 octagonal chestnut and Southern pine, 25 ft. @ \$4	1,048.00	524.00
31 octagonal chestnut and Southern pine, 30 ft. @ \$4.50,	139.50	62.00
54 square Southern pine, 25 ft. @ \$4	216.00	108.00
389 round chestnut, 25 ft. @ \$2	778.00	798.00
12 " " 30 ft. @ \$2.25	25.00	24.00
19 " " 35 ft. @ \$3	57.00	38.00
4 " " 40 ft. @ \$4	16.00	8.00
4 " " heavy, in town, 35 ft. @ \$4	16.00	8.00
1 iron junction pole, heavy, 32 ft. @ \$10	15.00	4.00
2 mast-arms in station @ \$9	18.00	
	<u>\$8,328.50</u>	<u>\$2,082.00</u>

WIRE.

6,000 ft. No. 4/0, .742 lbs. per ft., 4,452 lbs.		
5,940 " " 0 .386	2,292	
15,670 " " 1 .308	4,826	
9,480 " " 2 .244	2,313	
7,400 " " 4 .160	1,184	
404,165 " " 6 .111	44,862	
	59,929 @ .15 — .05 .	\$8,989.35
49,590 " " 10 .050	2,479 @ .16 — .05 .	396.64
13,960 " " 12 .035	488 @ .17 — .05 .	82.96
		<u>\$9,468.95</u>
		<u>\$2,996.45</u>
		<u>\$123.95</u>
		<u>24.50</u>
		<u>\$3,144.90</u>

[4 C 39]

CROSS-ARMS, PINS, INSULATORS, ETC.

28 10-pin cross-arms, .26 pins, and .15 ins., .30 @ 71c. .	\$19.88	\$14.00
78 6-pin " " .16 " " .09 " .15 " 40c. .	31.20	39.00
346 4-pin " " .14 " " .06 " .10 " 30c. .	103.80	173.00
1,550 2-pin " " .12 " " .03 " .05 " 20c. .	310.00	775.00
25 special " " for bridges @ 50	12.50	25.00
327 wood brackets, with insulators, @ 4c.	13.08	32.70
142 iron break arms " " " 40c.	56.80	14.20
77 iron angle " " " " 30c.	23.10	38.50
38 " pins @ 5c.	1.90	1.90
25 " centre pins for iron poles @ 10c.	2.50	12.50
14 extensions, with cross-arms, pins @ 50c.	7.00	7.00
35 iron guards @ 20c.	7.00	10.00
41 iron braces @ 7c.	2.37	8.20
5 extra cross-heads on poles on streets @ \$1	5.00	2.00
	<u>\$596.63</u>	<u>\$1,153.00</u>

MACHINERY, ETC., IN BOILER ROOM.

5 15 ft. x 5 ft. Manning boiler and setting @ \$950 . .	\$4,750.00	
1 Deane pump $5\frac{1}{2}$ x $3\frac{1}{4}$ x 5	140.00	\$15.00
1 Deane pump, No. 8, 12 x 7 x 12	225.00	20.00
1 National feed-water heater, 500 H. P.	350.00	20.00
1 dormant scale	145.00	25.00
1 iron wheelbarrow	6.00	
1 wooden wheelbarrow	3.00	
1 splicing bar	2.00	
1 poker	2.00	
	<u>\$5,623.00</u>	<u>\$80.00</u>

PIPING FOR ENTIRE PLANT.

Piping, 2 400-H.P. engines and boilers, heater, etc., complete @ \$4 H. P.	<u>\$3,200.00</u>
	<u>\$3,200.00</u>

[5 C 40]

MACHINERY, ETC., IN ENGINE ROOM.

2 Wheelock engines, 28 $\frac{1}{2}$ in. x 48 in., set up, 400 H. P. each, @ \$15	\$12,000.00
1 steam gauge	15.00
1 oiling set	10.00
1 oil tank	12.00
1 portable platform scale	20.00
	<u>\$12,057.00</u>

MACHINERY, ETC., IN WHEEL HOUSE.

4 45-in. Hercules water wheels complete, with gears and bearings	\$5,380.00	
4 Snow governors	500.00	
Wheel cases and supports, etc.	5,975.55	
1 extra wood tooth crown gear	360.00	
1 extra iron jack gear with shaft, 2 bevelled gear for governors, 10 extra dogs, 1 extra shoe for wheel	38.00	
1 extra step for wheel, 2 oil tanks	10.00	
Piping for pits	8.00	
	<u>\$12,461.55</u>	

MACHINERY, ETC., IN BASEMENT.

(a) *Shafting, etc.*

4 lines shafting, 666 ft. $5\frac{1}{2}$ in.	\$2,510.82	\$200.00
26 couplings, 6 in. @ \$36.30	943.80	50.00
20 pedestal boxes	500.00	20.00
66 shafting stands, 45 @ \$36.50, 21 @ \$32	1,314.50	132.00
8 loose pulley stands and horns @ \$45	360.00	40.00
2 idler stands and boxes @ \$20	40.00	10.00
12 6-arm clutches, 40 in. and 48 in., 8 @ \$125 = \$1,000, 4 @ \$135 = \$540	1,540.00	120.00
5 belt tighteners @ \$65	325.00	25.00
16 belt shifters @ \$10	160.00	48.00
1 tachometer	40.00	
3 oil filters	60.00	
	<u>\$7,794.12</u>	<u>\$645.00</u>

[6 C 41]

(b) *Pulleys.*

1 4,800-lb. fly wheel @ 5c.	\$240.00	\$50.00
4 water wheel pulleys, 96 in. x 26 in.	475.20	150.00
2 jack shaft pulleys, 56 in. x 26 in.	106.56	40.00
2 jack shaft pulleys on sleeve	106.56	40.00
1 sleeve	105.00	10.00
2 cross-over pulleys, 68 in. x 32 in.	175.56	40.00
1 engine pulley or sleeve, 60 in. x 42 in.	108.90	20.00
1 sleeve	110.00	10.00
1 engine pulley, 60 in. x 42 in.	108.90	15.00
16 arc dynamo pulleys, 48 in. x $10\frac{1}{2}$ in.	307.20	80.00
16 " " " loose, 48 in. x $10\frac{1}{2}$ in.	307.20	80.00
2 incandescent dynamo pulleys, 56 in. x $10\frac{1}{2}$ in.	48.60	10.00
2 " " " loose, 56 in. by $10\frac{1}{2}$ in.	48.60	10.00
2 clutch dynamo pulleys, $56\frac{1}{2}$ in. x 10 in.	135.48	25.00
1 alternating dynamo pulley, 56 in. x 16 in.	33.48	10.00

1	500-v. dynamo pulley, 58 in. x 26 in.	\$56.16	\$10.00
2	idle pulleys, 57½ in. x 15 in.	33.36	20.00
2	binder pulleys for Eng. blt., 42 in. x 43 in.	132.00	20.00
1	idle pulley " " " 42 in. x 43 in.	66.00	10.00
2	binder pulleys for wheel drive, 36 in. x 26 in.	65.60	25.00
		<u>\$2,770.16</u>	<u>\$675.00</u>

(c) Belts.

1	40-in. double, 127 ft. @ \$15.60	\$1,981.20	
1	40-in. " 152 " " 15.60	2,371.20	
14	8-in. " 34 " ea. @ \$2.48	1,180.48	
2	6-in. " 34 " " 1.84	125.12	
2	11-in. " 34½ " " 3.44	237.36	
1	16-in. " 36½ " " 5.20	189.80	
2	24-in. " 61½ " " 8.40	1,033.20	
2	24-in. " 54 " " 8.40	907.20	
1	22-in. " 36½ " " 7.60	277.40	
1	33-in. " 67 " " 12.50	837.50	
2	2½-in. single, 30½ " ea. " .36	10.98	
3	2½-in. " 20 " " " .36	7.20	

[7 C 42]

1	4-in. " 20 " " .60	12.00	
1	4-in. " 30½ " " .60	18.30	
2	2½-in. " 25½ " " .36	9.27	
1	4-in. " 22½ " " .60	13.35	
1	2-in. " 21½ " " .28	6.02	
2	3-in. " 22½ " " .44	9.90	
1	2-in. " 17 " " .28	4.76	\$200.00
		<u>\$9,232.24</u>	
	Less 60%	<u>5,539.34</u>	
		<u>\$3,692.90</u>	<u>\$200.00</u>

MATERIAL IN STORE ROOM.

1	arc light testing rack, 25 switches	\$20.00	
1	incandescent testing rack, 40 sockets, etc.	25.00	
1	lathe 6-ft. bed swing, with counter	125.00	\$15.00
3	checks for same	30.00	
1	hoisting crane	50.00	5.00
1	hoisting crab	30.00	3.00
1	heavy truck	4.00	
1	small truck	2.00	
		<u>\$286.00</u>	<u>\$23.00</u>

OFFICE IN STATION.

1 roll-top desk	\$25.00
1 flat top desk	8.00
1 revolving office chair	2.50
2 cane seat chairs	2.50
1 letter-copying press and cabinet	15.00
1 clock	5.00
1 drafting table	10.00
1 relay for telephone	1.00
1 large map of city	12.00
	<hr/>
	\$81.00
	<hr/>

[8 C 43]

TOOLS.

1 meter scale for weighing meter plates	\$40.00
1 wire gauge	2.00
3 bench vises @ \$4	12.00
2 steel bars @ 40c. . . . .	.80
1 nail puller	1.00
1 9-in. cutting plier	1.25
1 splicing clamp	1.25
1 pipe tongs, $\frac{1}{2}$ -in. . . . .	.60
5 monkey wrenches: 12-in., 75c.; 15-in., \$1.25; 20-in., \$1.80	3.80
2 machinists' hammers	1.00
1 nail hammer . . . . .	.50
2 soldering irons . . . . .	.75
1 tinner's fire-pot	2.50
2 gasoline torches	4.00
1 clamp for guy wire . . . . .	.50
1 come-along clamp . . . . .	.75
1 pair climbers	2.50
2 bit braces @ 1.50	3.00
9 auger bits @ 25c.	2.25
1 10-in. draw shave . . . . .	.80
4 augers, 2-in., 1 $\frac{1}{8}$ -in., 1 $\frac{1}{2}$ -in., 1 $\frac{3}{4}$ -in. @ 75c.	3.00
4 digging spades @ 50c.	2.00
5 " spoons @ 75c.	3.75
2 iron tampers @ \$1	2.00
1 wood tamper @ 50c. . . . .	.50
1 pipe tamper	1.00
2 carrying hooks @ \$2.50	5.00
2 cant hooks without handles @ \$2	4.00
1 dead man with extra head	2.50
2 cast-steel digging bars @ \$1	2.00
2 limb trimmers @ \$2	4.00
1 axe . . . . .	.65

3 pike poles with pikes @ 75c.	\$2.25
13 pike poles without pikes @ 50c.	6.50
1 fork pole for raising mast-arms	2.00
4 trimmers' step ladders @ \$2	8.00
1 6-ft. ladder	1.25
1 13-ft. "	1.30
2 21-ft. " @ \$2	4.00
2 21-ft. " @ \$2	4.00
1 25-ft. "	2.50
1 push cart	4.00
2 hand lines, one 65 ft., one 85 ft., @ $\frac{1}{4}$ c. . . . .	.75

[9 C 44]

1 7-in. pliers	1.25
1 8-in. "	1.45
2 oil lanterns @ 75c.	1.50
1 75-ft. tape	1.00
1 splicing vise	1.25
1 strap and vise	2.25
1 swivel hook, 7-in. . . . .	.75
1 lifting harness for armatures	3.00
2 heavy hooks for armatures . . . . .	.50
1 armature chain, hooks, and triangle	1.50
1 heavy chain, 17 ft. 6 in. lug.	3.00
1 " " 6 " 4 " "	1.25
2 " " 7 " ea., with hook and ring	4.00
90 ft. $\frac{1}{4}$ -in. rope @ $\frac{1}{4}$ c. . . . .	.75
130 ft. $\frac{1}{4}$ -in. rope @ 1c.	1.30
138 ft. $\frac{1}{4}$ -in. rope @ $1\frac{1}{4}$ c.	1.72
1 set 3 $\frac{1}{2}$ -in. iron blocks, 1 sheave and 2 sheaves	3.50
1 " 6-in. wood " 2 " " 3 "	4.00
1 " 10-in. " " 2 " " 3 "	5.50
1 6-in. lighting screw plate, set	4.00
1 naphtha soldering pot	2.75
2 gas light stands	1.00

\$195.92

STATION WIRING.

102 lights wired up @ \$1.25	\$127.50
	<hr/>
	\$127.50
	<hr/>

[I D 45]

VALUE OF MACHINERY AND BUILDINGS, IF DEPRECIATED
ON ACCOUNT OF AGE AND CONDITION ONLY.

Headgate	\$4,000.00
Headgate machinery	500.00
Wooden fender	648.00

Wheelpit and tailrace	\$42,000.00
Wheel house	1,000.00
Tunnels	1,600.00
Dynamo building	19,000.00
Steam engine building	7,300.00
Boiler house	5,500.00
Chimney	6,000.00
Coal-bin	100.00
Sewer	50.00
	<hr/>
	\$87,989.00
Engineering, incidentals, and interest 10%	8,789.00
	<hr/>
	<u>\$96,687.00</u>

[I E 46]

VALUE OF APPARATUS AND MACHINERY, IF DEPRECIATED
ON ACCOUNT OF AGE AND CONDITION ONLY.

SUMMARY.

<i>Page.</i>		<i>Value.</i>	<i>Labor and Freight.</i>
1	Dynos and armatures	\$8,236.00	\$888.00
1	Switchboard, switches, and station instruments . .	1,375.00	192.00
2	Transformers	645.00	40.00
2	Arc lamps	5,362.00	2,053.00
2	Meters	567.00	99.00
2	Service details	428.90	1,961.50
3	Poles, mast arms, etc.	4,719.56	2,082.00
3	Wire	6,328.15	3,144.90
4	Cross-arms, pins, wire, etc.	379.76	1,153.00
4	Machinery in boiler-room	3,373.80	80.00
4	Piping of entire plant	2,560.00	
5	Machinery in engine-room	9,645.00	
5	" " wheel-house	9,969.24	
5	" " basement (shafting)	4,676.47	645.00
6	" " " (pulleys)	2,216.13	675.00
7	" " " (belting)	1,846.45	200.00
7	Material in store-room	168.00	23.00
7	Office in station	37.50	
8	Tools	92.65	
8	Station wiring	71.40	
		<hr/>	
		\$62,698.01	\$13,236.40
		13,236.40	
		<hr/>	
		\$75,934.41	
10%, engineering, incidentals, and interest		7,593.44	
		<hr/>	
		<u>\$83,527.85</u>	

[2 E 47]

DYNAMOS AND ARMATURES.

1	16-lt. Schuyler arc dynamos	16	
4	25-lt. " " "	100	
8	30-lt. " " "	240	
1	40-lt. " " "	40	
7	50-lt. " " "	350	
	746 @ \$6		\$4,476.00
2	500-lt. Edison inc. dynamos @ \$450		900.00
1	2,000-lt. G. E. alt., 120 kw.		1,000.00
1	40-lt. arc armature		150.00
1	100-kw. 500-v. Edison generator		1,000.00
1	30 " Edison inc. armature		150.00
1	100 " Edison 500-v. armature		350.00
1	exciter armature for alternator		60.00
1	7½ H.P. T. H. motor		150.00
			<u>\$8,236.00</u>
			<u>\$888.00</u>

SWITCHBOARD, SWITCHES, AND STATION INSTRUMENTS.

1	20-circuit 20-machine arc switchboard		\$600.00
29	ammeters in station: 20 Schuyler @ \$3, 6 Edison @ \$3, 3 T. H. @ \$4		90.00
1	Whitney 10-ampere portable		20.00
2	voltmeters in station: 1 T. H. @ \$15, 1 Edison @ \$10,		25.00
1	portable voltmeter		25.00
6	pressure indicators @ \$10		60.00
19	Schuyler arc regulators (go with dynamos).		
2	Holtzer-Cabot controllers @ \$75		150.00
7	switches @ \$3		21.00
14	feeder fuse blocks: 2 G. E. 100-amp. @ 2c., 12 Ed. plug @ 50c.		10.00
1	circuit breaker, 150 amp., T. H.		20.00
43	lightning arresters @ \$5		215.00
6	iron-clad equalizers: 2 100-amp. @ \$25, 2 50-amp. @ \$20, 2 25-amp. @ \$15		120.00
6	rheostats (go with machines).		
2	ground detectors: 1 Ed. lamp @ \$1, 1 T. H. transf. @ \$10		11.00
1	station transformer		8.00
			<u>\$1,375.00</u>
			<u>\$192.00</u>

[3 E 48]

TRANSFORMERS.

7	type F, 150-lt. T. H. transformers		\$560.00
1	" H, 150-lt. " " "		85.00
			<u>\$645.00</u>
			<u>\$40.00</u>

ARC LAMPS.

297 Schuyler double arc lamps @ \$10	\$2,970.00	
285 " single " " " " \$7	1,995.00	
73 " " " " " \$5 (repair shop)	365.00	
6 Waterhouse & Gamble arc lamps @ \$5	30.00	
1 Sperry arc lamp @ \$2	2.00	
	<u>\$5,362.00</u>	<u>\$2,053.00</u>

METERS.

2 No. 2 Edison meters complete @ \$4	\$8.00	
2 " 4 " " " " \$4	8.00	
3 " 8 " " " " \$6	18.00	
2 class 5 T. H. wattmeters @ \$15	30.00	
11 class 7½ wattmeters @ \$15	165.00	
3 " 15 T. H. wattmeters @ \$20	60.00	
6 " 25 T. H. " " \$25	150.00	
4 " 50 T. H. " " \$32	128.00	
	<u>\$567.00</u>	<u>\$99.00</u>

SERVICE DETAILS.

190 arc hanger-boards in stores @ 50c.	\$95.00	
76 switches on power connections @ 75c.	57.00	
163 porcelain cutouts, inc. connections, @ 30c.	48.90	
152 " " power " " 50c.	76.00	
112 Brady " arc " " \$1	112.00	
80 spark arresters @ 50c.	40.00	
270 service connections: 83 motors, 149 inc., 38 arc, @ \$5,		
	<u>\$428.90</u>	<u>\$1,961.50</u>

[4 E 49]

POLES, MAST ARMS, ETC.

273 iron poles, set, @ \$6	\$1,638.00	
194 octagonal chestnut and Southern pine poles, with hoods, hanger-boards, cross-heads, and steps, set, @ \$7	1,358.00	
15 square chestnut and Southern pine poles, with hoods, hanger-boards, cross-heads, and steps, set, @ \$7	105.00	
3 round chestnut and Southern pine poles, with hoods, hanger-boards, cross-heads, and steps, set, @ \$5	15.00	
43 mast-arm poles, with hoods, hanger-boards, and cables, complete, set, @ \$10	430.00	
262 octagonal chestnut and Southern pine, 25 ft. @ \$2	524.00	
31 " " " " " 30 " " \$2.50,	77.50	
54 square Southern pine, 25 ft. @ \$2	108.00	
389 round chestnut, 25 ft. @ \$1	389.00	
12 " " 30 " " \$1.13	13.56	
19 " " 35 " " \$1.50	28.50	

SCHEDULE OF W. H. BLOOD, Jr.

279

4 round chestnut, 40 ft. @ \$2	\$8.00	
4 " " heavy, in town, 35 ft. @ \$2	8.00	
1 iron junction pole, heavy, 32 ft. @ \$8	8.00	
2 mast arms in station @ \$9	9.00	
	<u>\$4,719.56</u>	<u>\$2,082.00</u>

WIRE.

6,000 ft. No. 4/0, .742 lbs. per ft., 4,452 lbs.		
5,940 " " 0 .386 " " " 2,292 "		
15,670 " " 1 .308 " " " 4,826 "		
9,480 " " 2 .244 " " " 2,313 "		
7,400 " " 4 .160 " " " 1,184 "		
40,416 " " 6 .111 " " " 44,862 "		
	59,929 " @ .10, .05,	\$5,992.90
49,590 ft. No. 10, .050 lbs. per ft., 2,479 lbs. @ .11, .05 .	276.69	
13,960 " " 12, .035 " " " 488 " " .12, .05 .	58.56	
	<u>\$6,328.15</u>	<u>\$3,144.90</u>

[5 E 50]

CROSS-ARMS, PINS, INSULATORS, ETC.

22 10-pin cross-arms .26, pins, .15, and ins. .30, @ 42c. .	\$11.76	
78 6-pin " .16, " .09, " " .15, " 24c. .	18.72	
346 4-pin " .14, " .06, " " .10, " 18c. .	62.28	
1,550 2-pin " .12, " .03, " " .05, " 12c. .	186.00	
25 special " for bridges @ 30c.	7.50	
327 wood brackets, with insulators, @ 3c.	21.81	
142 iron break arms, with insulators, @ 25c.	35.50	
77 iron angle arms, with insulators, @ 20c.	15.40	
38 " pins @ 3c.	1.14	
25 " centre pins for iron poles @ 7c.	1.75	
14 extensions, with cross-arms, pins, @ 40c.	5.60	
35 iron guards @ 15c.	5.25	
41 iron braces @ 5c.	2.05	
5 extra cross-heads on poles on streets @ \$1	5.00	
	<u>\$379.76</u>	<u>\$1,153.00</u>

MACHINERY, ETC., IN BOILER-ROOM.

5 15 ft. x 5 ft. Manning boiler settings.		
1 Deane pump $5\frac{1}{2}$ x $3\frac{1}{2}$ x 5.		
1 " " No. 8, 12 x 7 x 12.		
1 National feed water heater, 500 H.P.		
1 dormant scale.		
1 iron wheelbarrow.		
1 wooden wheelbarrow.		
1 splicing bar.		
1 poker.		
Reproduction cost, \$5,623		\$80.00
Reproduction value, 60%	<u>\$3,372.80</u>	

PIPING FOR ENTIRE PLANT.

Piping, 2 400 H.P. engines and boilers, heater, etc.

Reproduction cost, \$3,200.

Reproduction value, 80% \$2,560.00

[6 E 51]

MACHINERY, ETC., IN ENGINE-ROOM.

2 Wheelock engines, 400 H.P. each, 28½ in. x 48 in., set up.

1 steam gauge.

1 oiling set.

1 oil tank.

1 portable platform scale.

Reproduction cost, \$12,057.

Reproduction value, 80% \$9,645.00

MACHINERY, ETC., IN WHEEL-HOUSE.

4 45-in. Hercules water wheels complete, with gears and bearings.

4 Snow governors.

Wheel cases, supports, etc.

1 extra wood tooth crown gear.

1 extra iron jack gear, with shaft.

2 bevelled gear for governors.

10 extra dogs for governors.

1 " shoe " wheel.

1 " step " "

2 oil tanks.

Piping for pits.

Reproduction cost, \$12,461.55.

Reproduction value, 80% \$9,969.24

MACHINERY, ETC., IN BASEMENT.

(a) *Shafting, etc.*

4 lines shafting.

26 couplings, 6 in.

20 pedestal boxes.

66 shafting stands.

8 loose pulley stands and horns.

2 idler stands and boxes.

12 6-arm clutches.

5 belt tighteners.

16 belt shifters.

1 tachometer.

3 oil filters.

Reproduction cost, \$7,794.12.

Reproduction value, 60% \$4,676.47 \$645.00

[7 E 52]

(b) *Pulleys.*

- 1 4,800-lb. fly wheel.
- 4 water wheel pulleys.
- 2 jack shaft pulleys.
- 2 " " "
- 1 sleeve.
- 2 cross-over pulleys.
- 1 engine pulley or sleeve
- 1 sleeve.
- 1 engine pulley.
- 16 arc dynamo pulleys.
- 16 " " " loose.
- 2 incandescent dynamo pulleys.
- 2 " " " "
- 2 clutch dynamo pulleys.
- 1 alternating dynamo pulley.
- 1 500-volts dynamo pulley.
- 2 idle pulleys.
- 2 binder pulleys for Eng. blt.
- 1 idle " " " "
- 2 binder " " wheel drive.

Reproduction cost, \$2,770.16.

Reproduction value, 80%	\$2,216.13	\$675.00
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(c) *Belts.*

- 1 40-in. double, 127 ft.
- 1 40-in. " 152 "
- 14 8-in. " 34 " each.
- 2 6-in. " 34 " "
- 2 11-in. " 34½ " "
- 1 16-in. " 36½ " "
- 2 24-in. " 61½ "
- 2 24-in. " 54 "
- 1 22-in. " 36½ "
- 1 33-in. " 67 "
- 2 2½-in. single, 30½ ft. each.
- 3 2½-in. " 20 " "

[8 E 53]

- 1 4-in. " 20 "
- 1 4-in. " 30½ "
- 2 2½-in. " 25½ "
- 1 4-in. " 22½ "
- 1 2-in. " 21½ "
- 2 3-in. " 22½ "
- 1 2-in. " 17 "

Reproduction cost, \$3,692.90

Reproduction value, 50%	\$1,846.45	\$200.00
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MATERIAL IN STORE-ROOM.

1 arc light testing rack, 25 switches	\$10.00	
1 incandescent testing rack, 40 sockets, etc.	15.00	
1 lathe, 6 ft. bed, 14 in. swing, with counter	75.00	
3 chucks for same	20.00	
1 hoisting crane	30.00	
1 hoisting crab	15.00	
1 heavy truck	2.00	
1 small truck	1.00	
	<u>\$168.00</u>	<u>\$23.00</u>

OFFICE IN STATION.

1 roll top desk	\$15.00
1 flat top desk	5.00
1 revolving office chair	1.00
2 cane-seat chairs	1.00
1 letter copying press and cabinet	6.00
1 clock	2.00
1 draughting table	5.00
1 relay for telephone . . . . .	.50
1 large map of city	2.00
	<u>\$37.50</u>

[9 E 54]

TOOLS.

1 meter scale for weighing meter plates	\$20.00
1 wire gauge	1.00
3 bench vises @ \$2	6.00
2 steel bars @ 20c. . . . .	.40
1 nail puller . . . . .	.30
1 9-in. cutting plier . . . . .	.50
1 splicing clamp . . . . .	.75
1 pipe tongs, $\frac{1}{2}$ in. . . . .	.30
5 monkey-wrenches	1.50
2 machinists' hammers . . . . .	.50
1 nail hammer . . . . .	.25
2 soldering irons . . . . .	.15
1 tinners' fire pot . . . . .	.50
2 gasoline torches	1.50
1 clamp for guy wire	2.00
1 come-along clamp . . . . .	.25
1 pair climbers . . . . .	.35
2 bit braces . . . . .	.50
9 auger bits	1.50
1 10-in. draw shave	1.25
4 augers . . . . .	.40
4 digging spades	1.20

5 digging spoons	\$1.50
2 iron tampers	1.00
1 wood tamper . . . . .	.50
1 pipe " . . . . .	.50
2 carrying hooks	3.00
2 cant hooks without handles	2.00
1 dead man with extra head	1.75
2 cast-steel digging bars	1.00
1 limb trimmer	1.00
1 axe . . . . .	.30
3 pike poles with pikes	1.25
13 pike poles without pikes	3.00
1 fork pole for raising mast arms	1.00
4 trimmers' step ladders	2.00
1 6-ft. ladder . . . . .	.50
1 13-ft. " . . . . .	.75
2 21-ft. "	1.50
2 21-ft. "	1.50
1 25-ft. "	1.00
1 push cart	2.00
2 hand lines . . . . .	.50

[10 E 55]

1 7-in. pliers . . . . .	.50
1 8-in. " . . . . .	.60
2 oil lanterns . . . . .	.75
1 75-ft. tape . . . . .	.30
1 splicing vise . . . . .	.50
1 strap and vise	1.00
1 swivel hook, 7 in. . . . .	.25
1 lifting harness for armatures	1.50
2 heavy hooks for armatures . . . . .	.30
1 armature chain, hooks, and triangle	1.00
1 heavy chain, 17 ft. 6 in. long	1.50
1 " " 6 " 4 " " . . . . .	.75
2 " " 7 " each, with hook and ring	2.00
90 ft. $\frac{1}{4}$ -in. rope . . . . .	.35
130 ft. $\frac{3}{4}$ -in. rope . . . . .	.65
138 ft. $1\frac{1}{4}$ -in rope . . . . .	.80
1 set 3 $\frac{1}{2}$ -in. iron blocks, 1 sheave and 2 sheave	1.75
1 " 6-in. wood " 2 " " 3 "	2.00
1 " 10-in. " " 2 " " 3 "	2.75
1 6-in. lighting screw-plate set	1.50
1 naphtha soldering pot	1.25
2 gaslight stands50

\$92.60

STATION WIRING.

102 lights wired up @ 70c.	<u>\$71.40</u>
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[I F 56]

COST OF NEW PLANT (*exclusive of land*).TWO DIRECT CONNECTED UNITS, OF 300 K.W. CAPACITY EACH, ENGINES
COMPOUND CONDENSING.

Buildings and stack, boiler settings and foundations	\$22,000.00
Boilers and flue	5,500.00
Engines	21,600.00
Dynamos	21,000.00
Piping, pumps, heaters, and well	5,500.00
Economizer	3,000.00
Condensers	2,000.00
Cranes and hoists	2,000.00
Switchboard and wiring	3,000.00
Tools and miscellaneous equipment	750.00
Office furniture	150.00
	<hr/>
	\$86,500.00
Engineering and incidentals, 15%	12,975.00
	<hr/>
	\$99,475.00
Six months' interest @ 5%	2,486.00
	<hr/>
	\$101,961.00
	<hr/>

[2 F 57]

OUTSIDE CONSTRUCTION.

Poles set	\$6,000.00
Lamp brackets, etc.	1,500.00
Lamps and transformers	13,000.00
Wire, cross-arms, etc.	8,000.00
Meters	800.00
Transformers	1,200.00
Connections, labor, etc.	2,500.00
	<hr/>
	\$33,000.00
Engineering and incidentals, 15%	4,950.00
	<hr/>
	\$37,950.00
Six months' interest @ 5%	948.00
	<hr/>
	\$38,898.00
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[I G 58]

COST OF REMODELLING PRESENT PLANT.

4 125-lt. arc dynamos @ \$2,100	\$8,400.00
2 100-kw. alternators @ \$30 kw.	6,000.00
2 switchboards	2,500.00
662 arc lamps @ \$18	11,900.00
Meters	100.00

Changes in shafting, belting, etc.	\$1,000.00
Changes in foundations, wiring, etc.	1,500.00
Service detail charges	1,000.00
Wire, cross-arms, poles, and transformers	5,000.00
	<hr/>
	\$37,400.00
Engineering and contingencies, 15%	5,610.00
	<hr/>
	<u>\$43,010.00</u>

[EXHIBIT 150.*]

DEPRECIATION OF PARTS WHICH ARE TO BE RETAINED
FOR USE.

Buildings:

Dynamo building	\$14,851.88
Steam-engine building	6,550.72
Boiler house	4,037.44
Chimney	1,195.39
Coal bin	82.00
Sewer	77.87
	<hr/>
	\$26,795.20
Transformers	5.00
Meters	194.59
Service details	2,107.00
Poles, etc.	3,810.50
Wire	5,613.85
Cross arms, etc.	749.63
Machinery in boiler room	2,303.00
Piping	640.00
Machinery in engine room	2,412.00
Machinery in basement	13,277.18
Material in storeroom	129.00
Office in station	43.00
Tools	103.92
Station wiring	52.50
	<hr/>
Total	<u>\$58,236.37</u>

* Produced at a subsequent hearing by the witness, and printed here for convenience.

Q. Will you state, Mr. Blood, how you arrived at this estimate of \$61,390? A. I tried to take into consideration all of the factors which go to determine the valuation of the property.

Q. And what were those factors that you took into consideration? A. The age and condition, and adaptability to the service which the various parts were called upon to do.

Mr. GOULDING. At this point I should like to interrupt to say that this schedule seems to include an estimate of water power and water power machinery, in reference to which we claim that the witness has yet shown no qualification. I do not know but these are assumed values that he takes for that.

The CHAIRMAN. Yes; you can find out. It says "Water Power Machinery."

Mr. GREEN. I will ask the witness at this point: Whether or not you have had experience— Well, I will not interrupt at this point, because it interrupts my line of thought.

The CHAIRMAN. Go right on.

Q. In getting at your valuation, what quantities did you take? A. I assumed the quantities in the schedules furnished by the Company—

Q. At— A. At the request of counsel.

Q. At our request you took the company's quantities? A. Yes, sir.

Q. Whose prices did you use? A. I used my own.

Q. Whether or not you have had experience in the cost of water wheels and water wheel machinery? A. I have.

Q. Whether or not you have installed or put in water plants—put in the parts—bought them? A. I have not installed an entire water power plant, but I have remodelled water power plants and installed repairs on nearly every part of a water system.

Q. Now with that explanation will you proceed and state the line of thought and the reasons which led you to that result?

Mr. GOULDING. We object to the competency of the witness with reference to water power plants.

The CHAIRMAN. The witness does not pretend, as I understand, to testify to the value of the water power—only water power machinery.

(Question read.)

A. You mean the details in arriving at this valuation?

Q. Yes, tell us how you arrive at this valuation?

Mr. GOULDING. Certainly on page 15 he values the water power. At some time I shall want to know what his qualifications are.

Q. Mr. Blood, whether or not later on you have valued the water plant and power in one or two forms for the purpose of its use in connection with the electric light plant? A. I valued it as power for driving machinery.

Q. That is, its value to the electric light plant for power? A. For the purpose of its use in driving the dynamos.

Q. Now if you will return to my question. A. I tried to take into account what a purchaser would consider if he were going to buy this plant. The first thing that would strike him on entering the building would be the multitude of old style, small and inefficient dynamos. He would naturally think that the first thing to do would be to get rid—

Mr. BROOKS. I do not know how this can be competent.

Q. Well, in your opinion.

The CHAIRMAN. Give us your opinion; never mind about—

Q. State in your opinion what would be done. A. I should discard all of the dynamos on the floor and by so doing quite extensive changes would be necessary to the entire plant, particularly in the way of foundations, shafting, belting and switchboards. That being accomplished, there would be a question of lamps—arc lamps. I should consider the lamps in the present use of very little value. They are all in poor condition, and to my mind only worth their second-hand value. Then, going through the details of the complete plant, the meters—the Edison meters,—would be of practically no value. There would be many changes required on the outside wiring, and the connection between the outside wiring and the customers. The poles and mast-arms seem to me to be entirely out of keeping with a plant of this kind, and certainly I should remodel that system. The wiring outside would need to be entirely changed. A great deal of heavy wire that is now up would be useful only as scrap. That, of course, would necessitate the corresponding change in cross-arms, pins and insulators. Of the machinery in the boiler room, the boilers, piping and engines might be used as they are. The shafting and pulleys, as I stated before, need to be materially

changed. The other items are of minor importance until we come to the buildings. The buildings are, in my mind, entirely too large for the work required of them—the service required of them, and it would seem to me if I was purchasing the plant that I should not care to pay for twice as much—

Mr. GOULDING. I do not understand that that is competent evidence. If you have any opinions here to give, give them.

Q. Simply say "In my opinion." A. In my opinion the buildings are fully twice as large as there is any need of. That would cover the dynamo building, the steam engine building and the boiler house. The chimney is much larger than is necessary, but it is very well constructed and could certainly be utilized. The coal bin and sewer are minor items; they would do as they are.

Q. Now in going over it as you have, will you state how you have dealt with the various parts of this property? In case, for instance, of the property there that you could, in your opinion, continue to use, what value have you given it? A. The property which I would continue to use I have put in at what I considered the depreciated value.

Q. Depreciated on account of what? A. On account of age and condition.

Q. Take such property as you did not consider that you would continue to use or which, in your opinion, would not be used longer, how did you value that? A. I valued that in general for what it would bring if sold upon the floor of the building, or, in other words, its removal value. It would be of no further use to me than what I could realize in a sale as second-hand material.

Q. Now you state that in your opinion the dynamos would be removed and other dynamos put in. What, in January, 1898, if remodelling this plant, would you have installed as dynamos?

Mr. GOULDING. I object.

Mr. GREEN. I think it is competent and relevant.

The CHAIRMAN. I doubt it. You are creating by that a new condition, as I suggested to you the other day. That evidence was employed for the purpose of showing the advantage, if anything, of a more modern machine, or something of that kind. But you are asking this witness to take stuff out of this

property and put in new. Perhaps there may be something in the argument that inasmuch as this is your property, you claim that you are compelled to do that. I would like to hear you gentlemen on that.

Mr. GREEN. My position in regard to that point is this: A witness states as a part of his opinion, that there is some stuff there in the form of dynamos which could not be used; economy would require its removal. That leads up to other conditions in this plant. If that is removed, something must be replaced, and, as he stated, the removal of this would lead to other and extensive changes in the plant—necessitate them. Now while he does not actually put them in, the city of Holyoke, in his opinion, when it gets hold of this junk heap, must remove the dynamos from this building. It is a practical question to us, a practical question to deal with. He says in his opinion that certain things would be put in there, and that leads up to his further changes which he thinks are necessary to be made. It seems to me that—

The CHAIRMAN. Let me ask you right here, Mr. Green, saying that that might be so, how much does that help you in your estimation of the valuations? For instance, your experts say this stuff should be taken out.

Mr. GREEN. Yes.

The CHAIRMAN. Your experts further say it would cost \$25,000 to put new things in there.

Mr. GREEN. Yes.

The CHAIRMAN. What advantage is that on the question of valuation? Could you claim that the Company by any manner of means should contribute anything towards helping you out on that new stuff?

Mr. GREEN. Yes, indirectly in a way, and no, if taken in another sense. We say that the most absurd method of valuation in connection with a mechanical plant is to limit the valuation to reproductive cost depreciated on account of age and use; that the value must be obtained by considering the plant, considering what must be done with the plant, what changes must be made in it and necessarily must be made. Now if we have a plant that necessitates an expenditure of \$100,000 in order to put it in shape, necessitates an expenditure of \$100,000 in order to put it in a position of economical and proper operation, that is an item which,

it seems to me, as a common sense proposition that a purchaser has a right and would take into consideration, and that therefore it is a proposition which this Commission would have a right to consider from the lips of our experts as a part of the testimony in the case. I should consider it entirely proper to show to this Commission how much money would have to be expended if we were valuing the plant today, for instance, upon repairs and changes in order to put this plant into a condition of useful operation.

The CHAIRMAN. And make these people pay for it; that is about the size of it.

Mr. GREEN. Pay for it in this sense: that the plant is worth so much less.

The CHAIRMAN. Why, my dear sir, the plant is only worth so much, and you can show the valuation of the property that is there. You can also, if you are allowed to, show that there are modern improvements or things that could be changed so that the plant might be run more economically. All those things are elements bearing on market value. But now conceive, for instance, that we were trying to ascertain the market value of a house; could you put in testimony as to the cost of re-shingling that house as bearing on the question of market value?

Mr. GREEN. If the shingling of that house necessitates some other changes—if it got in such a condition that you must shingle it, and in consequence of shingling it you must do something else, it seems to me that a witness who testified that you must remove the present shingles would have a right to state the cost of putting on new shingles, and he might testify to the kind of new shingles that would be put on, and he would have a right to state the further changes which would be necessitated by those changes. We have a building with dynamos; we have to take out those dynamos; we do not put new dynamos actually, but in the opinion of the witness certain dynamos would have to be put in. Those dynamos call for certain shafting and belting to operate with; as a result certain shafting and belting which is in there—which is all I am getting at at present—is not needed.

The CHAIRMAN. What was the rule that we adopted as to the testimony of Mr. Warner? This same principle came up, and Mr. Warner suggested certain changes and improvements to be

made in those buildings. The only question is, where we are going to stop. You have started on such an interminable condition of details that there is no man in the world that can bring them together.

Mr. GREEN. I do not think that your Honor will have very much difficulty in bringing this together. It is certainly an extremely practical question from the standpoint of the city of Holyoke. If the Commission is to award this plant to us, you are to do it on some basis of valuation. Put it in a nutshell, the subsequent changes depend in a measure upon the kind of dynamos that are put in there; in other words, the kind of dynamos which, in the opinion of this witness, were suitable for use in January, 1898. I could remodel my question a trifle, perhaps, but I did not suppose the objection was to the mere form of the question.

The CHAIRMAN. What do you say to this, gentlemen?

Mr. GOULDING. We objected to a specific question, which, as I understand it, was what kind of a plant he would inaugurate there—install there—if he was going to install one in January, 1898. That was the substance of the question. Now we say that is no evidence that ever was admitted in any court of justice in valuing any particular piece of property. As well might you, if it was a question of the value of a house of the colonial style, ask the witness whether he would erect a house of the Queen Anne style in place of it, and how much that Queen Anne house would cost. "What kind of a house would you erect there?" "I should erect a Queen Anne house." Now I say that that is a piece of Queen Anne-ity or inanity that will not be admitted in a court of justice that is trying to get at the value of a specific piece of property. Their position all through is just this: Why, your property is not worth anything because we have a fancy that if we bought it we should sweep it away and build something else entirely different. I submit that that is not competent evidence. They have got to buy this property, and they have got to pay what it is worth, and if they undertake to show the value of it, they have got to show it by competent evidence; not what something else would be worth, or what they would do with it when they get it—whether they would brush it away and build something else or not. That is the inherent, as it seems to me, fundamental and constant difficulty with the evidence.

(The question was read.)

The CHAIRMAN. I do not think that is competent, Mr. Green.

Mr. GREEN. I will frame another question.

The CHAIRMAN. Very well.

Mr. GREEN. Changing a word or two, perhaps.

The CHAIRMAN. I say "I do not think it is competent," I mean when I say that "we do not."

Mr. GREEN. I will drop that for a moment.

Q. Why, Mr. Blood, do you think the dynamos which are there installed could not be, or should not be, used longer? A. They are in my opinion very old and very inefficient.

Q. In what way inefficient? A. In that it requires a large input of horse-power for a comparatively small output of electrical energy.

Q. In connection with the use of these dynamos, or the inefficiency of these dynamos, what do you say of the efficiency of the rest of the plant, the shafting and belting and other parts as there used? A. A very large number of pulleys, belts, shafting and journal bearings makes an excessive loss in the transmission of the power from the water wheels or from the engines to the dynamos.

Q. And what about the efficiency of the distributing system, including in that arc lamps and all other parts? A. There is a comparatively complicated system of distribution. Any one particular part of it when fully loaded would probably be quite efficient, but the large number of circuits necessitated by the large number of different classes of service makes it an inadvisable system to maintain.

Q. Whether or not this condition, as you have described it, of inefficiency, requires any changes to be made in the plant?

Mr. BROOKS. Now, we object to that.

The CHAIRMAN. Now, it strikes me that the answer to that question might be competent under some conditions, and might be incompetent under other conditions. Counsel is asking you, Mr. Witness, whether in your judgment you see any necessity for any changes in the plant. It may go beyond, I do not know. If your purpose, Mr. Green, is to get in that which we have already excluded, we will exclude the question, if it is another way to arrive at the same result; but if it is for the purpose of giving

this witness an opportunity to take these premises and criticise and analyze them and point out wherein the defects lie, we will admit it.

Mr. BROOKS. Well, we would like to be heard upon that.

The CHAIRMAN. Very well.

Mr. BROOKS. For a moment. He has pointed out the defects, he says, and he says in substance that the distributing system is complicated,—perhaps he says it is inefficient,—and he stated why. Now, how can it be competent, may it please your Honors, to say that it should be replaced by something else? Why is it not the same question that has already been before you, and which has been decided?

The CHAIRMAN. Why cannot this witness as an expert among his reasons give his opinion?

Mr. BROOKS. How can that be a reason for his opinion?

The CHAIRMAN. I do not know.

Mr. BROOKS. I say upon the face of it it cannot constitute a reason for his opinion. He has given his opinion, he has told what his opinion is, and how it is formed, and how can it be a reason for an opinion as to what should be done with certain material? Supposing two men had agreed, one to buy and the other to sell a horse, and had agreed to leave the price of that horse to arbitration, and the horse happened to have a speed of 2.10, or such a matter, and the man who was the willing purchaser proposed to use that horse as a dray horse,—could it be said to the arbitrator with any degree of legal propriety that he would have a right to value that horse because it was going to be used as a dray horse and because as a trotting horse it would be unfitted for the service that was required of him, and that, therefore, in the opinion of somebody he ought to have another horse and a different horse for the peculiar services that he desired of him? It seems to me it is the very same question that you have dealt with.

The CHAIRMAN. I will put another illustration. There is an old book; it has done service for some years and has some value. A new edition or a new book is brought here where I am trying to sell this old book to you. Now, the fact that there is a new edition or a new book can be shown, but I cannot in trying to sell that, or rather, I am not going to take the covers off that book and put on new covers, and that is, it seems to me, exactly what you are trying to do, Mr. Green.

Mr. GREEN. I have asked a question which leads up to this, whether in the opinion—(to the stenographer) will you read the question exactly?

(The stenographer read the question, as follows: "Whether or not this condition, as you have described it, of inefficiency, requires any changes to be made in the plant?")

Mr. GREEN. Now, I think that that question is proper, and for this reason: The witness has pointed out, it is true, that there are certain conditions in this plant, the pole line, for instance, is complicated. Now, my horsey friend on the other side may be able to tell from that just what value that will give to the plant. Perhaps the Commission can. I could not. Is that condition of such a nature, is that condition so bad, in other words, that the pole line or distributing line cannot be used? Is it so bad that it is necessary to make immediate changes in it? That is what it means.

The CHAIRMAN. Changes in the machines that are there, changes in the property, so far as it would affect the thing itself, yes, point them out.

Mr. GREEN. I am going to ask him what changes he thinks it is necessary to make—

The CHAIRMAN. To take out these dynamos and put in new ones?

Mr. GREEN. He says he thinks it will be necessary to take out the dynamos.

The CHAIRMAN. He says the dynamos are practically worth about so much?

Mr. GREEN. Yes.

The CHAIRMAN. Now, then, you ask him to take this plant and re-create it, using part old and part new, and value it in that way, and I do not believe any property was ever valued in that way.

Mr. GREEN. I think the Commission still, if you will pardon me, entirely misapprehends the force of this argument and the force of this witness' statement.

Mr. COTTER. What is the purpose of the question, Mr. Green?

Mr. GREEN. The purpose is this: I want to have him able to tell us what changes he thinks it is necessary to make in this

plant to the extent of asking him what property he thinks can be used and what property cannot be used. I do not understand that this Commission is bound to value as property fit to use property which one cannot afford to use. You use the illustration of a book. As a working lawyer you would use one edition of a law-book; a few years later another edition might come out so further annotated and improved that you could not afford to use or keep the old one.

Mr. COTTER. But the old one has some value, has it not?

Mr. GREEN. It might have a second-hand value; it goes into the second-hand shop. Now, this witness takes that position: There is certain stuff there which would necessarily come out, and it has a second-hand value.

The CHAIRMAN. Very well; you have provided for that.

Mr. GREEN. I have provided for that, and now comes the next step as explanatory of the witness' figures. In order to tell what stuff may be used there in the line of the shafting and other things, he must have an opinion as to the form of dynamos, for instance, which would take the place, or ought to have an opinion as to the dynamos which would be used in the place of the dynamos which would be removed. We have got 26 dynamos which in his opinion, on account of their lack of efficiency and age, cannot be used. We have got underneath that building a perfect mass and jumble of shafting, belts and other things. Now, the question as to how much of that is good for use and how much is good for second-hand stuff would depend upon his idea of what would replace under good engineering the dynamos that are there.

Mr. COTTER. Supposing this gentleman tells us, then, that one kind of dynamo ought to be used here; do you think we ought to sit here and hear five or six others say he is entirely wrong, and others would put in a different class of dynamos?

Mr. GREEN. I should consider it entirely proper for this Commission to make up their minds what kind of dynamos ought to be used in this plant. That is the very thing which confronts the city of Holyoke when you award this plant to us.

The CHAIRMAN. Now, Mr. Green, let us run this thing out logically, if we can. We have got a building with a lot of things in it, certain dynamos, we will say, that the petitioner claims are

worth \$25,000, and you claim they are worth \$3,000, whatever the sum may be. Now, we may believe your witnesses or take your view and call those dynamos worth \$3,000. In the meantime you are going beyond that, you are saying: Well, that is the market value of the dynamos, \$3,100—the witness has just so stated. Now, you cannot go below \$3,100,—that is, we take your witness,—and yet you are asking us to go below practically, by showing that other machines could be put in there. When you put those other machines in there, you pay for those machines; they may cost you \$50,000. You have only had to pay the company the market value of the dynamos there, and therefore, the fact that you have got to replace them by new machines does not affect our valuation. It does not disturb us, and therefore what manner of use is it to you?

Mr. GREEN. Your Honor put a question to me a moment—

The CHAIRMAN. While this legal discussion is going on, Mr. Turner will have to be gone for half an hour or so.

Mr. GREEN. Your Honor put a question to me a moment ago which may complicate this question in your Honor's mind, and my answer to it. You have asked me something which I have not yet asked the witness for and am not now offering. You were asking me whether I thought we could put in evidence what it would cost to remodel this plant, and I still think so, but that is not any part of what I am doing now. I have not intended when I asked him to tell at this point what changes should be made, to go beyond the fact of what in his opinion the changes would have to be, and what changes would have to be made, and merely in connection with the changes in the shafting for him to state the class of dynamos which in his opinion under good engineering would be used there in place of these, in order to explain his changes in the shafting and tell us what portion of the shafting could or could not be used. I did not anticipate at this point asking what this machinery would cost.

The CHAIRMAN. If you were going to value that book, would you not value it as it stood rather than value it putting in the cost of rebinding? Now, how would you value that book? That is just exactly the same thing.

Mr. GREEN. I don't know what the book is; I don't know whether there is a new edition of the book; I don't know whether it has been improved or not.

The CHAIRMAN. I did not ask you that. Assuming that the book has some value, and I want to sell it to you, and you say "I will take it, but I am going to see how much it is going to cost to rebind that as bearing upon the value."

Mr. GREEN. That is not the argument in this case at all. If you should offer me that book for sale, I should probably want to know whether there is a new edition of the book; I should want to know how much it is worn, and I don't know but there might be this condition of affairs: If the book was in such a shape that the leaves were falling out and the whole thing was going into desuetude, as the plant of the Holyoke Water Power Company is, I might want to consider whether the cost of rebinding would be so excessive that I could not use it at all, but if I could rebind it for fifty cents, perhaps I could make fifty cents worth more use of it. That, however, is not the proposition here. We are now trying to determine whether the stuff can be used at all, whether it should be valued in use or whether it should be valued simply for what we can get for it and not use it.

Mr. COTTER. If it is not suitable or cannot be used for a certain purpose, does not that enable the witness to express an opinion as to its present value? If it is worth something only for junk, and something can be obtained for it for junk, that is his price, is it not?

Mr. GREEN. He is giving that price. The point is this, in order that the witness may make clear his statement as to the amount of shafting and belting which he considers proper for the purpose of its use, and in order to make clear the part which he says he thinks simply is to be valued at its removal value because it is of no use, it seems to me that he could state the changes which he thinks under good engineering would be made in the dynamo room. That is as far as I had gone, and all that I asked for.

Mr. GOULDING. Instead of describing the machinery and telling what its condition is, what its age is, what its fashion is, what its relation to the art is, they insist upon a transfiguration, they are going to have a transfiguration, and what will a transfiguration cost. It is a costly thing undoubtedly. I submit it is not any legal evidence.

Mr. GREEN. Some time ago, when your Honor asked me a

question, I did not apply it to this branch of the case. I applied it later on. A man has got to consider this proposition: He makes up his mind what this property is worth to be used, that is the thing he is trying to find out, what is it worth to be used. One of the ways of finding out, and one of the most valuable ways of finding out, is to find out what it will cost to operate it after you have got it. It is like any other machine; you cannot afford to buy a machine if it is going to cost you more to operate than it ought under good practice. Now, a part of the cost of this plant is going to be the remodeling of this plant, and when a man studies this plant from the standpoint of operation he would consider, first, what he pays down; second, what he has got to pay to put it into condition, and then he figures on the total cost to him, his fixed charges, consisting of his interest, taxes, depreciation, maintenance and other items that we have dealt with. Those charges each go to tell him how much it is going to cost to operate this plant here, dependent entirely upon the two factors of what he pays down first, and, second, what he has to pay in order to put that plant into a shape where he can afford to operate it, and in that sense and in order to study that plant from the standpoint of operating expense, he has got to know how much it is going to cost him to put it into condition, because the fixed charges and interest are just as much an expense of running as the material, the labor or the coal or anything else, and that is what I had in mind.

The CHAIRMAN. Let us see about that. Say I own a house, you do not like it, but you are going to buy it. You say, "I will buy it, and we leave it to some one to say how much that is worth in the market," so I put the house in the market. I don't put the future changes, or your future changes, into the market. Those are things which, if you choose to make, are your own affair. You can attack my house by saying it is old-fashioned, that it is expensive to keep up, that the walls are falling in, but you take that condition, the condition that they are in, at the time I undertake to sell you the house. You say, "how much is it going to cost to build up those walls, how much is it going to cost," afterwards.

Mr. GREEN. I have been led to believe that your Honor is a practical man, and if I am going around offering a house for sale,

and you found the shingles were rotten and the walls were falling in—

Mr. GOULDING. No one is paying for rotten shingles.

Mr. GREEN. —how would your Honor determine what that was worth? Would you not consider what it was going to cost to have that house made habitable?

Mr. GOULDING. I should like to have counsel point to a decision where in valuing a house evidence was allowed as to what it would cost to put on shingles that had not been put on, and any such thing, and more particularly what it would cost to run the house after you had got it fixed. The trouble about it is, my friend's logic may be in some forum of some importance, but in a court of law I submit that no such evidence is competent whatever. It is not the reasoning of the law as to what it is going to cost in the future to run this plant in the condition it is now or what it is going to cost to run it modified as this witness would have it modified. That is where we stand. It seems to me it is not a question where there is more or less of reason possible, to be taken into account more or less by the purchaser, but whether that kind of evidence is competent in order to prove what the present value is.

Mr. GREEN. My brother admits that the force of reason might apply; I think it applies very strongly. I believe it is common-sense, and as an old justice up in Tolland once told Judge Dunbar and Brother Ely, he didn't know much about law, but he did about good common-sense, and in his opinion good common-sense was pretty good law. I have not any case to apply.

Mr. GOULDING. I don't think common-sense has anything to do with it.

Mr. GREEN. I think it has, and I think we have a right to show what it will cost to operate this plant.

The CHAIRMAN. At its present situation?

Mr. GREEN. Yes, but in order to study this plant we must also find out what it is going to cost to operate it after it has been altered in order to ascertain if it is worth while to alter it at all.

The CHAIRMAN. I don't know—

Mr. GREEN. It seems to me it must be so. Supposing, in other words, that it is impossible to make changes in this plant that will allow it to be operated economically in the condition of a

plant that a man would build new, then we say that the whole thing is simply worth a dismantlement value. It cannot have value if it is going to cost us more to operate than another plant which we might build.

The CHAIRMAN. That relates to the present condition, my dear sir, and nothing else.

Mr. COTTER. Mr. Green, can this witness give us the fair market value of this property? Don't you think he takes into consideration its disadvantages and imperfections just as he found them?

Mr. GREEN. Yes, but we desire to submit his reasons to this Court, and these are his reasons, he is stating to the Court his reasons for that value. Now, it seems to me that his opinion has got to be weighed by this Court. I do not believe this Court in the trial of this case should take a lot of results from a lot of witnesses and average those results up. I think my client will suffer an injustice in this case if it is done. I think that this Court has got to analyze the reasons of the witnesses to see what weight lies behind their figures. Now, his reason for that result contains certain processes, and we think we have a right to bring them to the attention of the Commission.

Mr. BROOKS. My always-leading-up-to-something-else friend, it seems to me, entirely misapprehends this situation. It cannot be a reason; he has given his reason. He said that mechanism cannot be used, that and certain other mechanisms cannot be used economically. Now, can it be a reason that he put in something else? How can that constitute any reason? I was suggesting to Mr. Goulding just now—not to be personal here—supposing a man wanted to buy a certain structure, and he had a snoring wife, and according to the arrangement of the interior he would not be able to sleep in peace nights, and therefore it would become necessary, according to his views, to build out an ell and so protect himself from the resonance of the midnight snores. How would it be competent for him to have framed a schedule upon that theory as to how much it was going to cost to put on an ell for protection against his snoring wife?

Mr. GREEN. That is about as logical as most of the comparisons which I think our friends introduce in this case.

Mr. GOULDING. You cannot monopolize all the logic in this case.

Mr. GREEN. If there had been an expert introduced who had such a proposition as that among his reasons, I should think it would be well for the Commission to know it.

The CHAIRMAN. To come back to the original question, let us look at it in this way: You take and develop just this theory of yours, you have got rid of your other dynamos and thrown them out, and you say, "I will allow you \$3,100." Now, what are we going to do with this fact of these other things coming in? We have said to you from the start, and certainly you ought to understand it, that you can show that there are better, more modern machines in the market, as bearing upon the market value of that property there, and that is as far as I think you ought to go, and yet Brother Cotter has just made a suggestion that there may be something in, and that is that the witness if he is asked for his reasons can go into this. That I doubt very much indeed; I don't know whether he can or not.

Mr. MATTHEWS. While we are waiting for Mr. Commissioner Turner, I might perhaps add to the gayety of the occasion.

The CHAIRMAN. Yes.

Mr. MATTHEWS. We consider this a vital test of the true theory of valuation as applied to this case. I am not speaking of any one question that has been asked or discussed during the last half hour, but of all of the questions that Mr. Green has suggested. In one form or another, the questions all go to the same point—they all make in the same direction. This Commission will admit, and has admitted, the evidence of our experts, showing that this plant has a reduced value for a variety of reasons, including the efficiency of service, the expensiveness to operate, and the existence of more modern machinery at the present time. There is no question about that. They have admitted that evidence. In the particular case of these dynamos, for instance, they have admitted Mr. Blood's opinion that they are worth only \$3,000 as against \$20,000, which is said to be their value by the experts on the other side.

Mr. GOULDING. Who admits it?

Mr. MATTHEWS. The evidence has been admitted by the Commission. But is the Commission going to accept Mr Blood's opinion? If so, we need not seek to press the matter any further. But there is another party to the controversy. They

have to be heard upon it, and their witnesses do not agree with Mr. Blood, and therefore the question for your Honors to determine is whether Mr. Blood is right or Mr. Prichard. I took the figure of \$20,000 from Mr. Prichard's schedule, which I just looked up. How can your Honors determine that question unless you look behind the surface, look beyond that plant just as it is, and see what that plant ought to be, in order to be a good working, practical, commercial plant?—unless you determine what ought to be there, in order to give first cost as the value of the existing plant. Mr. Prichard's figure of \$20,000 is obtained by assuming that those dynamos are worth first cost today. That is practically his method. He allows a little for depreciation due to use and age, but very little. He takes the cost to reproduce, less depreciation due to use and age, and he thus gets \$20,000; and that, we may admit for the purpose of this interlocutory argument, is the value of those dynamos on their theory. Mr. Blood gets \$3,000 by adopting another theory. Now which theory is right? How is it possible for your Honors to determine that question unless you understand what his theory is and consider the different elements which he has taken into account?

The CHAIRMAN. What is his theory?

Mr. MATTHEWS. His theory is this: That these dynamos, as they stand, cannot be operated economically, and are not worth keeping; not simply for the city of Holyoke as a purchaser, but for the owner of the plant today,—and that they ought to be taken out.

The CHAIRMAN. We have let that all in.

Mr. MATTHEWS. Exactly. But are you going to adopt Mr. Blood's result and say that their value is \$3,000? If not, shouldn't he be permitted to say what he gains by throwing out these dynamos and putting in others, and where the Company would come out if they operate with new dynamos in preference to continuing with the present ones? You cannot decide whether Mr. Blood is right or wrong unless you know what the Company is going to gain or lose by the substitution of the new machines for those now there. I do not see how it is possible to get at it otherwise.

It seems to me that it is not simply a typical question, but one the decision of which covers this whole case, and goes to the root

of the true theory of valuing a manufacturing plant. Every illustration that has been made by counsel on the other side or from the bench today, has related to something which is not a going, active manufacturing plant. In valuing a house I think we should be permitted to show it is out of repair, and what it would cost to put it in repair. That is my judgment of what the law is. But we should not claim we could put in evidence of what it cost to live in that house. It is not a commercial manufacturing plant. The same with a horse, the illustration my friends on the other side are so fond of, and the same with the book. Every class of property must be valued upon theories which are applicable to it. We have in this case a manufacturing plant, and that is something totally different from a book or house or horse, unless the house should be used for manufacturing purposes. You have a manufacturing plant to value here, and we maintain that the only way in which you can value that plant is to consider what it will cost to operate it, in comparison with the cost to operate such a plant as the Company ought to have. The purpose is not to value the plant which is used for the sake of comparison, but to get at the business value of the existing plant.

That is the object we try to keep in mind. We do not ask your Honors to value the dynamos Mr. Blood would put in; but we ask your Honors to take their cost into account, and the cost to operate the same; to compare those two items with the cost to operate the existing dynamos, and the cost to reproduce them. And when you have got those four factors you have the means of determining in your own minds what you would pay for the present dynamos rather than take them out and put in new ones. It is impossible, it seems to us, to value a manufacturing plant except upon that theory; and therefore this question, while it only relates to dynamos, yet the various forms in which it has been suggested for discussion by the other side, is vital to this case.

It was suggested by the Chairman that this line of inquiry might lead to remote investigations. I would like to point out that we are at the threshold of our case. This is only our second witness upon the electric light plant. He was only under examination half an hour when this question arose. It is our case; it is the beginning of it, the foundation of it, and the end of it. If we are right in our theory, the value of this electric light plant

is only \$100,000 more or less, including the water plant and everything, and taking water at measured rates. If, on the other hand, we are wrong in our theory and we have got to pay reproductive cost, we shall have to pay \$100,000 or \$150,000 more. This proposition is vital to us, and I think we ought to be allowed to try out our case upon our own theory, just as a similar privilege has been afforded to the other side.

Let me suggest this consideration to your Honors. Suppose that this were the first witness in the case, not merely for us, but for the other side. Suppose that the position of the parties with reference to the right of precedence had been reversed. We should then have got to the essence of this problem at the outset, with our first witness; whereas, as the case has been tried, we contend that all that has gone before, all this mass of evidence which is printed in six volumes, has practically been wasted, because the witnesses for the Company have not attempted in a single case to give you the value of this property as a manufacturing unit. They have simply told you, on the one hand, what would be the result of capitalizing a certain sum of money at a certain rate; and, on the other hand, and in the alternative, what would be the cost to reproduce today the existing plant, item by item, part by part, making a slight allowance for depreciation due to use and wear alone. We say that both those lines of evidence are absolutely irrelevant, that neither of them has anything whatever to do with the question which is being litigated before this tribunal, because neither of them touches the value of this plant as a manufacturing unit—its value to you or me if we owned it today. Not to the city of Holyoke in particular, but its value to you or me or anybody, if we took it and used it to turn out electrical energy amounting on the average to 79 or 80 kilowatts. There has not been a line of evidence in the first six volumes of this case to indicate to your Honors any approximation to the real value of this plant. We are getting it now for the first time. We are endeavoring to point out what a man could afford to pay for this plant for the purpose of manufacturing and distributing the electric fluid to the inhabitants of Holyoke. It is absolutely immaterial what it would cost to reproduce this plant. The question is what it will cost to operate it, and how are you going to get at that? Obviously by finding the cost to operate a proper

modern plant, the plant that you would have built if you had the cash in your pocket and no plant, and were going into the business of lighting the streets of Holyoke by electricity and furnishing the inhabitants with the electric fluid for power and heat. That is the question, and all the evidence in this case that has gone before is, it seems to us, beyond the case. We might rather have objected to evidence of reproductive cost as having nothing to do with the cost, than the gentlemen upon the other side could fairly object to our putting evidence of the cost to install a plant in Holyoke proper to do the business that is being done by this plant, and of the cost to operate it. That must be the maximum value of the present plant, no matter what it cost originally, and no matter what it would cost to reproduce today. No man in his senses would pay more for a manufacturing plant than what he could get another plant for that would do the work that is being done by that plant and do it as economically and as efficiently.

The CHAIRMAN. We have admitted evidence on that theory all the way through.

Mr. MATTHEWS. This is the same thing.

The CHAIRMAN. No, if I do not misunderstand you entirely.

Mr. MATTHEWS. To our mind it is the same thing.

The CHAIRMAN. Let me state to you what I understand, and then you can discuss it later more at length if you want to. I understand this question to be, What would be the proper machinery to put in there, in this plant, to take the place of that which is taken out?

Mr. MATTHEWS. For the purpose of getting at the relative efficiency and economy of operation of the two plants, yes.

The CHAIRMAN. No; but you have got your ideal or modern plant.

Mr. MATTHEWS. We haven't got it from this witness yet—we are getting it.

The CHAIRMAN. No, not at all. You are simply using the plant that is being valued; the value changes.

Mr. MATTHEWS. I understand this witness is doing exactly what Mr. Warner did, in substance, only in a little different order and in a little different manner. Mr. Warner presented you

with an entirely new plant. What Mr. Blood is doing with the dynamos is exactly what Mr. Warner did with the whole. We do not see any difference. Am I not right, Mr. Green?

Mr. GREEN. Substantially the same, in fact.

Mr. MATTHEWS. It is substantially the same process, except that we ask him now only about the dynamos. We shall go on and ask about the other parts of the plant. This remodelling, whether done piecemeal as Mr. Blood is doing it, or whether done once for all in complete designs and plans as Mr. Warner did it, is all for the purpose of getting something with which we can compare the existing plant, to the end that you may value that; and we cannot see the slightest difference in principle between allowing us to put in evidence of the design and cost of an entire new plant, and allowing us to offer evidence of the design and cost of a plant which is new in part. We were rather surprised that any objection should be made today, because we supposed this line of evidence was exactly the same as had already been admitted subject to the final determination of the Commission.

The CHAIRMAN. If you put it on that ground, I should certainly hesitate about excluding it.

Mr. MATTHEWS. It also seems to us admissible as part of the reasons or data which the witness used in reaching his opinions of value. That is a distinct question, however.

The preceding question was read by the stenographer, as follows:

"Whether or not this condition, as you have described it, of inefficiency, requires any changes to be made in the plant?"

The CHAIRMAN. And then Mr. Green stated he intended to go further, beyond that.

Mr. GOULDING. I have heard this argument over and over again, so many times that I do not think it is necessary for me to reply to it again. I have attempted to reply to it and have said what I could about it. But the word "absolutely," these things that are mathematically certain, that are so far beyond discussion, in the minds of our friends on the other side, rather suggest the propriety of our intimating, whenever they insist upon using the word, that what they say would be true if it were exactly

reversed. Every witness that we have put on has given the unit value of these properties—every one of them—and they have grounded their opinion about the unit value of it as a manufacturing concern upon various methods, among others the evidence of reproductive cost. Now, counsel thinks that he can by iterating it make it true that they have given no opinion about cost, except by adding together the items of reproductive cost. Let him iterate it as long as the katydid iterates her statement that “Katy did,” all through the ages, and when he gets through it will be simply untrue and not according to the facts, and the evidence shows it. The whole difficulty with the proposition is, I think—at any rate, one striking difficulty—that they are not aware what the question is here on trial. If I remember my Whately’s Logic, it is *ignoratio elenchi*. They are arguing and trying to prove another question—that is all the matter with them. We have done as well as we could to call attention to the fact that the question they have here is something else. It is not the question whether they shall purchase this property or shall not; whether there are, in the range of consideration, reasons which would induce this imaginary purchaser, who does not live anywhere but is a mere conception, to go away from Holyoke and not to buy it at all. Whether there are or not is not of any consequence whatever. The question is, when he is bound to buy it, what is the market value of this property, and you cannot show that by showing what the market value is of something else that is entirely different. I say you cannot as a matter of law, without discussing and certainly not admitting the common sense of the proposition that if you have that imaginary purchaser corralled somewhere, and you were studying what his mental processes would be on the question which is not before this Court, to wit, the question whether he should purchase it or let it alone,—that is one thing. I do not either assert or deny that their propositions have common sense in them; but I say that on the question of what these parties have got to buy, or, that is, what this tribunal has got to value—the value of this property—the value of something else is not competent. It never was anywhere, in any court that I know of, allowed. There has been some talk about it in a court where they were estimating tax questions of an entirely different sort, out West, as to what should be charged, what rates, etc. But

there has been no decision in this state, nor, so far as I know, anywhere else, that on the value of a specific piece of property you could show what somebody's opinion was as to the value of something else. Now we have been betrayed again into a final argument of this case. Counsel on the other side say that their proposition is the question. I simply say it is not the question, some other question is the question.

Mr. BROOKS. It is not, we say, even a comparison with the ideal. The question is here what it is going to cost to make certain changes in that plant. Now I say it is an entirely different question from the question that has been admitted for future consideration, of a comparison of this structure and its contents with some other non-existing structure which might be built, with its contents or machinery. The question is what it would cost to change; that cannot be competent.

The CHAIRMAN. Gentlemen, we have considered this subject, and we will dispose of it in this way. Mr. Matthews claims that this is a part of the theory that he is undertaking to establish. We have not accepted that theory in any part or line of it. Neither have we accepted certain theories that the other side have advanced. To develop the thing, however, he claims that this evidence should go in. That makes me hesitate, for one reason. And in order to give an opportunity to parties to develop these theories, although they lengthen out a good deal, while it may be to some extent incorrect not to meet this question now, yet I think it is the fairer method to let this testimony go forward, and particularly, as suggested by Mr. Cotter, since this man is put on as an expert and has got to give his reasons. Now he may, in the course of giving his reasons, give some illegal reasons; reasons, I mean, that are not pertinent, improper, and should be excluded. We hear his reasons, and proceed upon the theory that the petitioner will have a right to ask that those reasons be struck out, and we will pass upon the question in the end and reserve you your rights. So you can go forward, Mr. Green.

The question was read by the stenographer, as follows:

"Whether or not this condition, as you have described it, of inefficiency, requires any changes to be made in the plant?"

A. It would.

Q. Now you stated some time ago that in your opinion the dynamos would not be used. Do you have in mind any other dynamos that would do the same work more efficiently? A. I have.

Q. And what are they?

The CHAIRMAN. Do you want to wait for Mr. Turner? He will be back in a few minutes.

Mr. GREEN. Yes, I will wait.

(Recess.)

Q. Mr. Blood, what changes, in your opinion, would have to be made in order to operate the plant economically and efficiently? A. There would have to be changes made in the dynamos which are installed in the plant. There would have to be changes made upon the outside wiring—

Q. Well, what changes in the dynamos? A. The present dynamos would have to be replaced by four arc dynamos of 125 lights capacity each, and two 100-kilowatt alternating current dynamos.

Q. That would be 6 dynamos doing the work of the 26? A. Yes, sir.

Q. The 2 alternating current machines are 2-phase or 3-phase? A. They are 2 or 3-phase.

Q. Yes, either 2 or 3-phase. What machines that are now there would they replace; in other words, the work of what machines would they do? A. The four arc dynamos would take the place of all of the Schuyler arc dynamos which are now in the plant. The alternating current dynamos would take the place of the Edison incandescent dynamos, the General Electric alternating dynamo and the 500-volt power dynamo.

By Mr. BROOKS.

Q. What page does this appear on of your schedule? A. It does not appear in my schedule.

By Mr. GREEN.

Q. As I understand you—I interrupted you, as I recall. You had touched upon changes in the dynamos; what other changes? A. Following that change in the dynamos would necessitate a change in the switchboard, in the wiring, in the foundations, in the shafting, belting, pulleys. It would require change in the

outside lines, change in the transformers, and there would also be necessary a change in the arc lamps and in the meters. Those are the principal ones.

Q. What do you say of that shafting and belting ~~and the rest~~ of the apparatus in the basement there used in running these dynamos in regard to its usefulness in case this plant is run from 6 machines instead of from 26 as it is? A. About three-quarters of it would be of no use; could be dispensed with entirely.

Q. Running by steam? A. Yes, sir.

By Mr. GOULDING.

Q. Three-quarters of what? the shafting? A. The shafting, belting and pulleys which are now in the plant.

By Mr. GREEN.

Q. That is, whether there is any loss of efficiency in the use of so much shafting? A. There is, considerable loss.

Q. That is, power lost between the engine and the dynamos? A. Lost in the shafting and belting.

Q. Whether or not it is an advantage to have as little shafting as possible? A. It is, a decided advantage to reduce that to as low as possible.

Q. In what way is power lost in the belting? A. It is lost in the belting because the belts slip on the pulleys. It is lost indirectly by the belting because the belting must be of a certain tension in order to transmit the power, and that produces more friction upon the bearings, so that power is consumed there.

Q. Now let us take up your schedule A. You have not paged this, as I believe, in my copy? A. It is after page 3. The schedules have their individual pages on them.

Q. I see. Following page 3 you have a summary of market value. And that summary occupies pages 1 and 2 of schedule A, and then we come to the details on page 3 of the same schedule. The value that you give to these dynamos, as I understand you, is a removal value on the floor? A. It is, yes, sir.

Q. Is there any difference between the expression, in your mind, of "removal value" and "junk value"?

Mr. BROOKS. What page of the schedule is it?

Mr. GREEN. It is page 3 of schedule A—the schedule itself.

Q. If you make no distinction—or is there any distinction in

your mind between "second hand value" and "junk value"? A. Yes, there is a little distinction, not very great; in some cases there would be a difference.

Q. How do you use the expressions "second hand value" and "removal value"? A. The second hand value and removal value I considered the same.

Q. On page 4 of the same schedule, "Switchboard, switches and station instruments." You say that that value is a second hand value. Will you state more particularly, if you can, why they are not to be valued for the purpose of future use? A. Making an exception of the arc switchboard, nearly everything else in that schedule would be discarded when the dynamos were discarded. The arc switchboard would be utilized to a certain extent.

Q. You have given a depreciated value, then, for the arc switchboard? A. Yes, sir.

Q. The transformers you give a second hand value to, as I understand. You would continue to use those? A. I would continue to use those.

Q. That is, in your opinion, they are suitable? A. They are suitable to a certain extent,—at a reduced capacity, probably.

Q. Whether or not in your opinion, to put the question the other way, the dynamos are suitable for the purpose of their use? A. They are not.

Mr. BROOKS. Wait a moment. Is not that the same question that was ruled out the other day?

Mr. GREEN. They ruled out the other because I incorporated a financial proposition into it. I understood there would have been no objection if the man had testified that the water power was not suitable.

The CHAIRMAN. I did not hear the question.

Mr. GREEN. I asked if, in his opinion, the dynamos which were in this dynamo room were suitable for the purpose of their use.

The CHAIRMAN. Why, he has already answered that they were not.

Mr. GREEN. He has in another form, only I did not use the word "suitable." My brother quarrels over that.

Mr. BROOKS. I understood that that was ruled out the

other day; I may be mistaken about it. Anyway I would like to save the question.

Mr. COTTER. We will let him testify, in view of the understanding that we have had that after the discussion—

Mr. BROOKS. Oh, yes, all questions are reserved to us.

The CHAIRMAN. Yes.

Mr. BROOKS. Along the line of this schedule, until closing argument.

The CHAIRMAN. Yes.

Mr. BROOKS. That is all right. Until the last closing argument, I meant to say.

Mr. GREEN. Until the closing argument?

Mr. MATTHEWS. I do not understand why that ruling should apply to this question, your Honor.

The CHAIRMAN. Why not?

Mr. MATTHEWS. Why, the Commissioners have said over and over again that our witnesses could testify whether or not such and such a part of the plant was suitable for the purposes for which it was being used.

The CHAIRMAN. Well, we have admitted it; I do not see that you need anything more.

Mr. MATTHEWS. If it is admitted on the same ground that the testimony which is conceded to be on the doubtful line goes in—

The CHAIRMAN. I do not see any difficulty with the question, I confess; there may be. I was about to make a suggestion to you, Mr. Green. I have looked over schedule A. I see that the witness has noted under each thing—made a statement with reference to its condition. Do you want anything more than that?

Mr. BROOKS. We do not agree, may it please your Honor, that the essay that is printed in this schedule is competent evidence.

Mr. GREEN. I think if my brother refers by that to the first three pages, that they are a statement of his reasons and properly a part of a schedule.

The CHAIRMAN. He has stated them orally. The schedule is the mathematical part of the case—

Mr. BROOKS. I do not understand a man can—

The CHAIRMAN. He has already gone over that ground orally; now let us go to arc lamps.

Mr. GREEN. I had a question pending.

The CHAIRMAN. We admit it. What do you say—whether these are suitable or not?

A. I do not consider them suitable.

Mr. BROOKS. We note an exception.

Q. On page 5 of schedule A you refer to the arc lamps. Is there anything that you would say in addition to the statement here made, that they are in poor condition and good only as second hand material? A. I might add that I saw at one time a lot of them in Holyoke which were entirely out of repair and good only as junk; and further, that these lamps, being all old type of lamps, it is very hard to get repair parts for them even if any one desired to maintain them as a part of the machinery.

Q. You state under the head of "Meters" that the Edison meters are worthless. Why? A. They would be worthless with the change in the system, because they could not be used upon the alternating current system.

Q. The watt meters, however, you have valued for the purpose of future use? A. Yes, sir.

Q. What is included under the expression "Service details"? A. It includes the wiring from the line to the customers, together with the switches, cut-outs, arc hanger boards and spark arresters, and various other small details.

Q. I notice up above you have schedule E, page 3, also service details. That is the schedule of depreciated cost? A. Depreciated value on account of age and condition only.

Q. Well, the cost depreciated on account of age and condition. You take the original cost, do you not, and depreciate on account of age and condition? A. Yes, sir.

Q. Well, the cost new in 1898—what it cost new in 1898. Have you anything to say with regard to the poles and mast-arms other than that contained in your statement on page 5 of schedule A? A. The poles are in very poor condition; many of them are rotted out, iron ones rusted out, and iron poles such as they have in Holyoke for the use of arc lamps are very undesirable.

Q. What do you say about the size of the poles there, if you

recall them—the iron poles? A. I do not remember now the dimensions of the iron poles.

Q. Have you anything to say of the condition of the wires as you saw them last? A. They appear to me to be in a very—

Mr. BROOKS. Excuse me a moment. Has it appeared when he made the examination?

Q. When did you see them, I desire to know? A. The first time I saw them, I think, was in the summer of 1898, and I also saw them about a year ago—I cannot say—possibly in February.

Q. State how they appeared to you the first time, and what you noticed about them the second time, if you care to, separately. A. The same description will apply to both times very nearly—that they were in very poor condition, many wires were slack; many wires, the insulation had rotted off and decayed, leaving the wires bare. The plant was arranged without system and rather, on the whole, a mixed-up mass of wiring which would be very difficult to untangle and straighten out and adapt to a new system.

Q. When you say that the wire lines were mixed up, what did you have reference to? A. I mean the general arrangement of the wires and the poles and cross arms.

Q. You have given them a depreciated value, however, as shown in schedule E, as I understand it? A. I have. I may also say, with your permission, that apparently some of the poles had rotted off and had been cut down and replanted the second time.

Q. Turning to page 6, what do you say of the wire, whether you would use it as it is, whether it could be efficiently and economically used as it is, or whether changes should be made, in your judgment? A. The larger wire, the 0000 wire particularly, would be of no use in a remodelled plant, and all of the other wire would have to be more or less changed about to put it in good operative condition, and considerable would have to be replaced.

Q. Do you think that it is necessary, in order to operate efficiently and economically, to make the changes that you suggest? A. I do.

Q. Do you think that the results would justify the expenditure for changes? A. Yes, sir.

Q. Taking the subject of cross arms, pins and insulators, what part would be used and what part would be of no value, if you can tell us in a general way? Will that be shown on page 5 of schedule E? A. It will be shown in reference to page—

Q. Turning to page 5, schedule E, the latter part of the book.

A. Yes, schedule E, page 5, about two thirds of the way through the book.

(The preceding question, "Taking the subject of cross arms, pins and insulators," etc., was read by the stenographer.)

Q. I asked that because I noticed you had so described it in what you have to say on page 6 of schedule A. A. We would use a large part of them. Possibly a third of them would be of no value.

Q. I do not know as I need to allude to machinery in the boiler room. You appear to have given a depreciated value to it. Let me ask you this general question: So far as it would be economical to use the present plant, or the parts of it, have you valued it in use, as running? A. I have.

Q. Have you anything to say in regard to the machinery in the engine room, further than the fact that you used a depreciated value of it? A. Except that in making this estimate it was my idea to make a few changes, such as would be in accordance with good engineering practice, utilizing everything as far as possible in the condition that it is now.

Q. You have already alluded to the machinery in the basement. You allow for about a quarter of that to be used? A. Yes, sir.

Q. I do not know that we need to deal with the office in the station, tools, wiring, etc. Now we come to the buildings. Will you show to the Commission in any way you please, by illustration or otherwise—this is page 8 of schedule A—wherein those buildings are too large, and why only about a half, as you put it here, is needed?

(The witness produced a plan.)

Mr. GREEN. I do not think this will answer. If you will bring the tracing down from which this was made, we will go back to that.

Q. Now, I understand that you arrived at your value of the present plant from the considerations entirely as now stated by you? A. I did, yes, sir.

Q. What next did you do, and why? A. I also considered what it would cost to erect at that time, 1898, a new plant designed in accordance with good engineering methods.

Q. Did you pick out any particular place to locate a new plant? A. I did not.

Q. What did you assume? A. I assumed that it might be located anywhere in the city of Holyoke where you could get water for boiler and for condensing purposes.

Q. What did you estimate that such a plant would cost, apart from the land? A. \$140,859.

Q. And that is how much less than what you have figured the reproductive cost of the present plant for? A. That is, as I make it, \$106,567 less than the present plant could be reproduced for.

Q. Will you state the line of reasoning adopted by you in regard to this new plant, following the general course of the pages that you have here? Some of these pages may not appear in the report in this way. A. I tried to consider this matter in an ordinary business sense; that is, that the purchaser would not for a moment think of paying more for an existing plant, which was old and worn out, and in many ways run down—he would not pay more for such a plant than he could erect a new and modern one for; and that a new and modern one, capable of doing the same work, would cost \$140,859, and in no event could an old plant be worth more than that.

Q. If the amount of earnings which had been made in the use of the plant during the year past could be taken into account, and the same earnings assumed for the year following, would that make any difference in your figures? A. The only way I considered the earnings is this: That a purchaser buying the existing plant would be all ready to go right to work, he could commence earning money, whereas a new plant it would take something like six months to complete; and from the testimony I understand that the net earnings were something like \$20,000; so that the existing plant, if that were considered—the earnings were considered—could not in any way be worth more than \$10,000 more than a new plant.

Q. That \$10,000 represents what? A. Represents, as I understand, the net earnings of the Company for six months.

Q. It would be the net earnings during the period of construction of your new plant? A. Exactly.

Q. Now, whether or not you investigated at all the question of earnings, or simply took the Company's evidence out of the first volumes? A. I made no investigation myself. I took the evidence as in the first six volumes.

Q. And assumed the \$20,000 figure there stated? A. Yes, sir.

Q. Now will you proceed with your line of reasoning, showing the application you make of the new plant? That is, what would be the fixed charges on the difference in the investment of the old and new plant, taking each at its reproductive cost?

Mr. BROOKS. Where does that show?

Mr. GREEN. Page 5, at the bottom.

Mr. BROOKS. Page 5 of what?

Mr. GREEN. The general statement of his reasons is paged, and then he has put in his schedules as he goes along, unpagged.

The WITNESS. It is page 5, following schedule A. The fixed charges consist of—

Mr. BROOKS. Cannot we have this schedule paged in some way so we can refer to it in the record by pages?

Mr. GREEN. I will try to have it done this noon. I might explain that, in order to accommodate Mr. Warner, these schedules had to be prepared with great haste yesterday and were brought in this morning without any opportunity to examine them. Glancing at them hastily, I thought they were paged.

Q. Now, if you will go on. A. The fixed charges consist of interest, depreciation, taxes, insurance and repairs. The total of those I considered at 11 1-2 per cent.

Q. Give me the items. A. The interest I figure at 5 per cent., depreciation at 3 per cent., taxes at 1 per cent., insurance at one-half of 1 per cent., repairs 2 per cent.

Q. A total of 11 1-2 per cent? A. 11 1-2 per cent. Now I took the difference between the cost of the new plant and the estimated cost of reproducing the present plant at \$106,567, and that 11 1-2 per cent of that is \$12,255, which would be the fixed charges on the difference on the investment between the old and the new plant. Then I have taken from the testimony which is already in the cost of labor of operating the present plant.

Q. That is, you took whose statement? A. Mr. Foster's, Mr. Horatio A. Foster's, which shows the cost of running the combined steam and water plant, in labor alone, at \$3,650.

Mr. BROOKS. What page is that on?

Mr. GREEN. The next page, page 6.

The WITNESS. I estimate that the labor to operate the new plant will be \$4,888. Then I have assumed from figures which I received from Mr. Main, that 190 horse power per hour was the average load, and I have assumed that the plant was running 365 days at 24 hours a day, and that the coal consumption is 2 1-2 pounds per horse power per hour.

Q. At this point, whether or not you have experience so that you can tell us whether a new plant operated with the engines and boilers as outlined by you in a new plant, could run on 2 1-2 pounds per horse power hour?

Mr. BROOKS. I object to the question.

The CHAIRMAN. What is the trouble with it?

Mr. BROOKS. How can he pass on his experience? It is for your Honors, isn't it?

Mr. GREEN. I suppose the man knows from his experience how much coal it takes per horse power per hour. I asked him whether he has had experience by which he can know how much coal is used.

Mr. BROOKS. I do not know how he can pass on that question.

The CHAIRMAN. If he knows. Do you want to examine him on that question, as to his competency?

Mr. BROOKS. I do not want to examine him. It is for them to show his competency. I think I am right about that.

The CHAIRMAN. I thought they had made some efforts in that direction.

Mr. BROOKS. But he asks him now, Are you competent to express an opinion?

The CHAIRMAN. (To Mr. Green.) Why don't you examine him, then, if there is any question raised with reference to his competency?

Q. Mr. Blood, will you tell us if you have had experience with engines and boilers, compound-condensing engines, the running of them? A. I have, in the running of them, and have also in the testing of them and the working up of the tests.

Q. Have you tested them relative to the amount of coal consumed per horse power hour? A. I have.

By the CHAIRMAN.

Q. You have passed on that question, have you? A. Yes, sir.

The CHAIRMAN. Unless the respondent desires to cross-examine on this evidence, we will admit the evidence.

The preceding question was read by the stenographer, as follows:

“At this point, whether or not you have experience so that you can tell us whether a new plant operated with the engines and boilers as outlined by you in a new plant, could run on 2 1-2 pounds' per horse power hour?”

A. Yes.

By Mr. GREEN.

Q. And whether or not they could run on that amount of coal? A. They could.

Q. Now if you will proceed. A. Figuring on that basis, and assuming the price of coal at \$4.05, I find the yearly cost of coal would be \$7,520.

Q. Were you asked by counsel to assume that figure? A. I was.

Q. Now if you will proceed. A. Then I say that the new plant would cost to run in labor \$1,238 more than the old one, and the coal per year would be \$7,520, making a total of \$8,758. The fixed charges alone, however, on the extra investment of the old plant above the new plant, are \$12,255, so it proves to my mind that one could better afford to put in a new plant than to pay anything whatever for the old plant in excess of what the new one cost.

Q. Have you omitted any factors there? A. I have.

Q. What have you omitted so far? What would be the bearing of it if you put them in? A. I took no consideration of the cost of land, and I assumed from the testimony which has gone before that cheaper land could be procured in Holyoke than the land on which the plant is now situated. I also made no allowance, in using Mr. Foster's figures, for the item of coal which he shows amounting to \$1,663, which the combined plant now uses,

and I have also taken out—I have not taken into consideration—the amount that would be saved in the remodelled plant in labor and in carbons on using a modern system of arc lighting.

Q. All of those items, if I understand you correctly, would make the cost of operating a new plant still less in comparison with the old plant? A. Or it would increase the cost of the operation of the old plant. It amounts to the same thing.

Q. Now will you tell us how you have laid out your new plant, or, in other words, a plant that you think under good engineering would have been installed new in January, 1898? A. An engineer laying out a new plant—if I were laying out a new plant in 1898, I think that I should have installed two direct-connected alternating current dynamos of about 300 kilowatts capacity each. That would give me either dynamo of sufficient capacity to run the entire plant. I should put in engines, which would be compound condensing engines, of sufficient size to operate these dynamos easily, and boilers of sufficient capacity, and arranged for at least one idle boiler; and I should install them in a building of sufficient size to easily contain them and still have room for additional—for increase in the plant.

Q. Will you tell me this. You said in building a new plant in 1898 you would put in two 300 kilowatt dynamos, alternating current, yet you stated awhile ago that in your judgment if you remodelled the present plant you would put in six machines, two alternating current machines and four 125-light arc machines. Why the difference? A. In order to make as little change as possible in the existing plant, I remodelled it as simply as I could. It would have made a very much better plant out of it, but it would not have brought it up to what I think an engineer would have done in laying out a new plant. The new plant I have laid out on the lines of the best engineering practice, the practice that was most thoroughly up-to-date.

Q. Are there any obstacles? Is there anything about the levels, the lay-out of the present plant, which interferes with putting in direct-connected units, in your judgment? A. No, sir, there is not.

Mr. GREEN. I will take up that question, I think, when you have your plan here, after lunch.

(Noon recess.)

AFTERNOON SESSION.

WILLIAM H. BLOOD, JR., *resumed.**Direct examination by Mr. GREEN, continued.*

Q. I wish to revert now to a question which I suspended until we could get this plan. Will you illustrate to us by the use of any plan or otherwise, how it is that the present plant is too large? A. The drawing I present is a copy of the plans already in the case, and I have made to scale some little—

Q. Before you come to this, the drawing which you have here is marked "General Plan of the Holyoke Water Power Company's Electric Light & Power Plant"? A. Yes, sir.

Q. And shows the floor plan of the boiler room, engine room and dynamo room? A. Yes.

Q. It shows the floor plan, so far as the dynamo room is concerned, of the first floor? A. It does, yes, sir.

Q. It shows also, as I understand, the engines in their present place, the dynamos in their present place, the switchboard as it is now situated, and all the different parts as they are situated thereon, just as it is shown on the plans of the Holyoke Water Power Company? A. Yes, sir.

Q. Whether or not it is copied from the plan submitted by them? A. It is a tracing from that plan.

Q. Now will you proceed in your own way to show us what you mean? A. Following out the general lines submitted this morning, that is, of using four 125 light arc machines and two 100-kilowatt machines, I have drawn to scale representations of machines, and propose to locate them on this plan. (Attaching small papers to the plan.) I have prepared those and placed them on the diagram here without any particular reference to the shafting or posts or any other thing which might conflict with operating them in the position in which they actually stand, and have placed them there simply to show that generating units of

practically the same capacity as those now in use could be installed and not occupy any more space than is shown by these diagrams.

Q. Those white diagrams, as you show them, which are superimposed on the drawing, are drawn to a scale, as I understand you? A. They are drawn to the same scale that the building and dynamos and various other things are drawn to.

Q. And the six machines represented by those six stickers do all the work which is done at present by this plant? A. Yes, sir, they could.

Q. What is to be done with the rest of the floor space? A. The rest of the floor space would be utilized for a switchboard, the present arc switchboard being utilized to a certain extent. There is sufficient room either side for another switchboard to operate in connection with the two alternating current machines. You could also reserve a small section for the repair room. But even doing all that, you would still have a room there that is more than twice as large as you have use for.

Q. And using this floor to accommodate your machines and your repair room and switchboard and other things which you have there, is there any need of a second story at all? A. No, sir; in fact, it is a detriment.

Q. In what way is it a detriment? A. Well, at present it is a sort of a firetrap. All sorts of old truck are stored up there, and in a building which is not fire proof it is certainly a detriment.

Q. Supposing for a moment it is or was or should become desirable to use direct-connected units instead of using these belted machines, in your opinion, is the dynamo room or dynamo building needed at all?

Mr. BROOKS. How is that of any consequence? I object to it.

Mr. GREEN. We have had some testimony—

The CHAIRMAN. I think we will take it, Mr. Brooks, subject to objection.

Mr. BROOKS. Very well.

A. The dynamo room then would not be necessary at all; the dynamo building would not be necessary.

Q. Where would you put your dynamos? A. The dynamos would be direct-connected to the engine and would easily be contained in the engine room.

Q. Have you drawn to a scale— A. I have drawn to a scale—

Q. What have you there drawn to a scale? A. I have drawn to a scale here two generators of 300-kilowatt capacity each, driven by engines of 450 horse power each.

Q. Now will you superimpose those and illustrate where they could be placed? A. I will try to place these so as not to cover up any more of the original drawing than I can help. (Attaching them to the plan.)

Q. In case direct-connected units are used, the dynamo building entirely disposed of, where would you put the switchboard, or is there room enough—tell me directly yourself where you would put the switchboard? A. There is ample room to put it; I had not considered just the most desirable location. It could without trouble be located anywhere on this side of the building. Beside that, you would also have room in this section of the building for still another unit of the same capacity as those now installed.

Q. There is room for putting in a third unit? A. Yes, sir.

Q. The same capacity. The two units that you have outlined there in the stickers represent two 300-kilowatt machines, do they not? A. They do.

Q. There is room for another 300 kilowatt machine? A. Yes, sir.

Q. Direct connected. Is there room enough, disregarding the dynamo building entirely, to have a work room? A. There is sufficient room for a work room with this new system. The repairs are very much smaller on this system and would not require anywhere near as large a workroom as is now utilized.

Q. Where would you suggest that the workroom would be? A. If you did not put in a third unit the natural place would be to put it on this side. If you did put it in, there would still be sufficient room almost anywhere on this side in a place not occupied by the switchboard.

Q. Your first suggestion was on the— Has this the points of compass on it? A. No.

Q. On the northerly side, the upper side of your plan? You do not know the points of compass? A. No, sir.

Q. Well, on the side towards the wheel house? A. Yes, sir, of the engine room.

Q. Will you explain to the Commission a little more fully why, in the use of either of the systems described in your stickers or illustrated by your stickers, there is no need of such a large repair room as is at present used in this plant, or in other words, why you need so little space for repair work? A. The machines which I have outlined are modern machines. There has been a great improvement in the art and there is a great deal less liability to burn out or to break down on the machines now—1898—than there was when the Schuyler machines were put in. Not only that, there are fewer machines, so the liability is less on that account. Beside that, the arc lamps which are at present at Holyoke require considerable space and labor to repair. I propose to use new and modern lamps which have removable parts, and which are easily and quickly repaired.

Q. From your practical experience, can you tell us whether or not the space which you suggest is sufficient for the work of a plant of this size? A. I can, and it is; yes, sir.

Q. In case the 300-kilowatt machines are used direct connected, there would be no belting or shafting, as I understand? A. No.

Q. Have you in mind now the levels of these three rooms? Do you know whether these three floors that you have represented are right along on a level, or whether they are on different levels? A. They are on different levels.

Q. How would it be necessary to get, in your opinion, the power from the engines to the six machines on the floor of the dynamo room, supposing that the buildings were not remodelled, taking them with the floors as they are and with their levels as they are? A. You would have to utilize some such similar method as is now employed, which is rather clumsy and undesirable. That is, by means of an idler for one thing, which is objectionable.

Q. Supposing that they were on the same level, how could you then belt them? A. They could be then belted direct to the engine without the intervention of any extra counter shafting.

Q. As I understand you, the belting would go to a shaft in the basement? A. Yes, sir.

Q. And then belt from that up? A. Yes, sir.

Q. I may have misunderstood those white stickers which are

placed in the engine room. Those represent more than generators, do they not? They represent the engines and generators put together? A. Those in the engine room represent the engines and dynamos together, the whole combination. Those in the dynamo room represent the dynamos alone.

Q. To be accurate, would you not turn them around, then,—or would you? This being the boiler room here? A. Yes. I stated in regard to these, and the same would apply to that, I had not placed them with any consideration of anything which may be now in the way of so locating them; simply as a matter of showing the relative size of these machines to the buildings in which they would be placed.

Q. Then those two white units which you have represented there in the engine room represent the engines and generators put together? A. Yes, sir.

Q. Now returning to page 17 of your schedule—the schedules have been paged during the lunch hour—

The CHAIRMAN. You had finished up on that page, Mr. Green.

Q. If you were putting in direct connected units, having the same levels that you have at the present time in this plant, could you use direct connected units in connection with the machinery of the water plant as well as of the engine room? A. Not very well; it would make a rather complicated system.

Q. Whether or not the plant—that is, the buildings, considering the way they are built and laid out—whether or not they are adapted to the use of modern types of machinery? A. They are not adapted to modern types of machinery.

Q. You stated that in your opinion the dynamos would be taken out that are now there, on account of the expense of their operation and their inefficiency, and in January, 1898, you would, in your judgment, have made use of the six machines that have been referred to. If the proposition was considered as of today, what machines would you make use of in connection with this particular plant? A. There are a good many things to be taken into consideration in answering that question. Perhaps I can answer it best in this way: the best engineering practice, the most up-to-date, would be that of putting in the two direct-connected alternating current units.

Q. But as I understand you, in order to leave this and pass on, that would not be feasible in connection with this plant if the water plants were used? A. No, sir, it would not be feasible.

Mr. BROOKS. Don't lead him quite so much, Mr. Green, if you can avoid it.

Mr. GREEN. I had only understood him to say so.

Mr. BROOKS. If he had said so it is in the record.

Q. Having outlined a new plant as you would have constructed it in January, 1898, what use did you make of it? That is on page 18. A. I used it to compare the cost of operation of the new plant with that of the old plant, the existing plant, and in making this comparative cost of operation I omitted such things as were common to both plants and would be immaterial.

Q. That is, for instance— A. The wages or the salary of the superintendent, book-keepers, etc.

Q. You have assumed in regard to your new plant—I think you have already stated— A. I have stated I assumed no particular spot except it was in the city of Holyoke where water for condensing purposes and boiler feed could be procured without expense.

Q. Are these your own figures in regard to amount of fuel and the labor and supplies, and so on? A. They are.

Q. The price of coal, as \$4.05 a ton, you obtained how? A. I took, at the request of counsel, at—

Q. At that figure? A. At that figure, yes, sir.

Q. Is there anything in regard to this labor that you desire to explain? I see you provide for two engineers and three firemen, an oiler, three wiremen, a trimmer and a helper. Are all of those men required inside the plant? A. The engineer, firemen and oiler are required inside the plant. The other men would be outside the plant, on the maintenance of the lines and lamps—service.

Q. Have you stated to us—you may have and I may have overlooked it—how much of an electrical output you have allowed for your new plant? A. I have figured that the output would be practically the same as the output of the existing plant.

Q. Your depreciation charges in this case are 9 1-2 per cent.? A. No, sir, the depreciation—

Q. I beg your pardon, the fixed charges. A. The fixed charges.

Q Wherein do those fixed charges differ from the fixed charges rate used in the old plant? You have "Interest 5 per cent., depreciation 3 per cent., taxes 1 per cent., insurance 1-2 per cent." That is on the new and modern plant. That leads me to inquire, in your opinion, would there be any difference in the depreciation rate of a new plant and of the present plant of the Water Power Company? A. As a matter of fact, there would be quite a difference. That is, the old plant would depreciate faster than the new one. I have, however, for the sake of comparison, called the percentage the same. To answer your other question, the difference between those fixed charges and the fixed charges that I have figured on page 14 is that I have left out of the fixed charges on page 18 repairs, and have put that in under the heading of "Repairs" in another item. It is not strictly a fixed charge.

Q. Whereabouts is that—oh, under "Repairs, supplies and miscellaneous"; "Miscellaneous repairs, \$2,800"? A. Yes, sir.

Q. What, in your opinion, would it cost to operate a new plant of the type of the one you have outlined? A. \$33,899.

Q. Now turning to page 19, you study in this schedule what problem? A. The cost of operating the old plant by steam entirely, and assuming that the city will purchase only the steam and electric plant and not purchase the water power plant.

Q. Now, what assumptions do you make? A. I assume that they run the plant as it is now, non-condensing, but that it ran 24 hours a day and 365 days per year.

Q. Is that the same way that you computed your new plant running? A. Yes, sir, it is, and further; that the present plant consumes 3.39 pounds of coal per horse power per hour and 34.5 pounds of water per horse power per hour. I have assumed those, taking the testimony of Mr. Foster.

Q. The 190 horse power, however, you have assumed from—
A. From Mr. Main.

Q. You have assumed the labor from whose figures, also? Or perhaps they are yours. A. The labor in this item I have taken from Mr. Foster—as far as possible I have taken the labor from Mr. Foster's testimony.

Q. I notice on page 20 that you compute your fixed charges on \$186,533. That is the reproductive cost, is it? A. The reproductive cost of the steam and electric plant, without the water power machinery.

Q. Making a total, to operate the old plant by steam on the basis of its reproductive cost, of \$48,342. A. That is correct.

Q. Now will you show us what use you make—

Mr. BROOKS. Mr. Green, is this reproductive cost taken from anybody?

Mr. GREEN. No, that is not; he fixes it himself. He assumes your quantities, at Mr. Matthews' and my request, and uses his own prices and material and figures out the cost on that basis.

Q. Now will you explain to the Commission what use you make of the two estimates that you prepare, one for the cost of operating the new plant, and the other for the cost of operating the present steam and electric plants, by steam alone? A. I have figured the total operating expenses of the new plant, exclusive of superintendence, book-keepers, etc., as I stated. That is of the new plant, and that amounts to \$33,899. I have figured the same thing for the steam and electric plant, the old plant, leaving out of consideration the fixed charges.

Q. That is, the old plant, the total operating expense, including fixed charges, amounts to \$48,342, as shown on page 20, is that right? A. That is right.

Q. And you subtract from that the fixed charges of \$17,720. Is that right? A. Yes, sir.

Q. The operating expense, then, of the old plant, running by steam alone and omitting fixed charges amounts to how much? A. \$30,622.

Q. The \$33,899, shown on page 18, represents all the operating expenses of your new plant, does it not? A. Yes, sir.

Q. Including— A. Fixed charges.

Q. That is, as shown on page 20, in the new plant the operating expenses are \$20,518 and the fixed charges \$13,381? A. Yes, sir.

Q. Total, \$33,899? A. That is correct.

Q. The operating expenses of the old plant, omitting all fixed charges, are how much? A. \$30,622.

Q. The difference between those two is how much? A. \$3,277.

Q. Now what does that \$3,277 represent? A. It represents the amount of fixed charges, which is the maximum amount that there should be on the old plant.

Q. On the supposition, that is, that the operating expense of one is not to exceed the other? A. Yes, sir; yes, sir, certainly.

Q. If you capitalize that \$3,277 at the fixed charge rate, what would be the result? A. \$34,494.

Q. If the present entire plant, steam, water and electric, of the Holyoke Water Power Company were purchased for \$34,494—I think I should have left out the water plant. If the present steam and electric plant of the Water Power Company were to be purchased for \$34,494, then how would the expense of the operation of your new plant and of the Water Power plants compare? A. The total operating expenses would be the same.

Q. That would make them the same? A. Yes, sir.

Mr. BROOKS. Wait a minute; Mr. Green, will you excuse me for a moment?

Mr. GREEN. Yes.

Mr. BROOKS. Do I understand that brings into the consideration the operation of the water?

Mr. GREEN. No.

Mr. BROOKS. Read me his question, Mr. Stenographer; I didn't catch it then.

(The question, "If the present steam and electric plant of the Water Power Company were to be purchased for \$34,494, then how would the expense of the operation of your new plant and of the Water Power plants compare," was read by the stenographer.)

By Mr. BROOKS.

Q. Did you understand that question, Mr. Witness? A. I didn't so understand it. He said it that way.

Q. I did, and I thought you did not from your answer. A. No, I did not.

Q. Or rather, we thought. A. I don't think Mr. Green understands that he gave the question that way either.

Mr. GREEN. Well, I meant, how does the expense of the steam and electric plant of the Holyoke Water Power Company and the expense of the new plant compare.

The WITNESS. I took it for granted that is what Mr. Green meant.

Mr. BROOKS. Do you mean the new steam plant?

Mr. GREEN. No, I don't mean the new steam plant; I mean

the new plant which he has suggested to us, his new steam and electric plant.

Mr. BROOKS. It must be a new steam plant.

Mr. GREEN. His new steam and electric plant.

By Mr. GREEN.

Q. That is, to put it another way, on the basis of the operating expenses of the steam and electric plant of the Water Power Company and the operating expense of the new and modern plant which you have suggested, how much,—or what is the value of the Water Power plant?

Mr. BROOKS. Well, now, I would like to have that question read. Let me have the question read.

(The question was read by the stenographer.)

Mr. BROOKS. I don't understand the question, but perhaps the witness does.

Q. Do you understand it, Mr. Blood? A. No, sir.

Mr. GREEN. (To the stenographer.) Will you read that over again?

(The question was read by the stenographer as follows: "That is, to put it another way, on the basis of the operating expenses of the steam and electric plant of the Water Power Company and the operating expense of the new and modern plant which you have suggested, how much,—or what is the value of the Water Power plant?")

Mr. GREEN. I meant to say "of the Water Power Company's plant."

Mr. BROOKS. Water power plant?

Mr. GREEN. Steam and electric, I mean.

Mr. BROOKS. Does the witness understand that?

A. I think so; I think Mr. Green means the steam and electric part of the Water Power Company's plant,—

Q. Yes. A. —and with that understanding, my answer is that \$34,494.

By Mr. BROOKS.

Q. That does not include water power? A. It does not.

By Mr. GREEN.

Q. Now, what does that result prove to you, or what use do you make of that result, rather? A. Well, it certainly shows to my mind that you would not think of running the plant as it is.

Q. You mean by that that you would remodel it? A. Yes; I mean that it would not be good—it would not be sound engineering or sound anything else to run it as it is.

Q. On page 21 you have stated what in your opinion would be done both in building a new plant and in remodeling the old plant. Is there anything there other than what you have already told us? A. I think not; I think I have substantially stated everything there is on that page.

Q. Have you estimated the cost of reconstructing and putting into condition to run more economically the present plant of the Water Power Company in accordance with the suggestions you have already made? A. I have, yes, sir.

Q. And how much do you say that would cost?

Mr. BROOKS. Where does that show up?

Mr. GREEN. That is on page 21, the statement.

A. That amount is \$43,010.

Q. And by adding that sum to the market value which you have ascertained, you make the total plant cost, exclusive of land in all cases, as I understand, \$104,400? A. It would make the expense to the city of the total plant \$104,400 before they got it into shape so that it would be good for anything.

Q. Have you in schedule G, on page 58, the last page of your schedules, the details of the changes which you suggest in this plant in order to get it into condition to run economically and efficiently? A. I have, yes, sir.

Q. That includes, I understand, the four 125 arc light dynamos and the two 100-kilowatt alternators? A. Yes, sir.

Q. You have in the next item two switchboards. What kind of switchboard do you provide? A. I would provide one switchboard which would be arranged to take care of the two 100-kilowatt alternators and distribute to the mains to give the service for incandescent lights and power, to take care of the customers which are now supplied by the Edison incandescent dynamos, the General Electric alternator and the 500-volt power machine. The other switchboard would be additions and changes on the present arc switchboard.

Q. You provide 662 arc lamps. Those are your enclosed arcs, I take it? A. Those are enclosed arcs, yes, sir.

Q. Is there anything you could tell us in regard to the effi-

ciency or power of those lamps? A. The enclosed arc lamp is a radical departure from the—what is called the open arc lamp which is now in use in Holyoke. The open arc lamp burns the carbons directly in the air, and the carbons have to be renewed about every—the lamps have to be trimmed about every ten or twelve hours at the maximum. With the enclosed arc lamps the carbons have to be renewed only about once in from 100 to 125 hours. The carbons, however, on the enclosed arc lamps are more expensive, but the net result is a saving of carbons, but also a very large saving with the enclosed arc lamps is in the matter of trimming.

Q. Whether or not the lamps that are used here in Boston are enclosed arc lamps?

Mr. BROOKS. The what? Wait a minute; I object to that. What difference does it make whether the lamps are used in Boston?

Mr. GREEN. It is simply a matter of illustration. If you object, I will not press it.

Mr. BROOKS. I object.

Mr. GREEN. It is withdrawn.

Q. Whether or not the enclosed arc lamp is in use at the present time, and to what extent? A. Very largely in use at the present time. Practically all new installations are putting in enclosed arc lamps, and many of the old installations are remodeling their plants and putting them in, and have for several years.

Mr. BROOKS. If this goes in, I suppose it is all subject to our general objection.

Q. Having ascertained the cost to the city of the present plant on the assumption that it pays \$61,390 for the existing plant, and expends \$43,010 for repairs, making a total of \$104,400, what is your next process? What use do you make of those figures?

A. I have utilized those figures to find out what I thought the city could pay for the water power plant, assuming that they pay \$1,500 per mill power per year for measured water.

Mr. BROOKS. Does this valuation, may it please your Honors, of water power come in under the general admission?

The CHAIRMAN. No, we do not say that. He is proceeding on that assumption.

Mr. BROOKS. In the schedule he goes further than that, I think.

The CHAIRMAN. I think he says on page 21, assuming they pay \$1,500 a mill power. That would increase the amount your witness states to—but go ahead, Mr. Green.

Mr. BROOKS. If it is merely an assumption, that is all right enough, only let us so understand it.

Mr. GREEN. We expect that this witness has shown qualifications enough to give an opinion of the value of the water power plant for the purpose of furnishing power to the electric plant, for the purpose of its use in that respect.

The CHAIRMAN. You have not quite reached that yet. You are now on page 22, you are assuming something now, and going on that assumption. Now we have arrived finally at page 22, haven't we?

Mr. GREEN. (To the stenographer.) Will you read the last question?

(The last question and answer were read.)

Q. Will you proceed?

Mr. BROOKS. What page?

A. Page 22. I have assumed that the remodelled plant is run by water 303 days per year and by steam 62 days per year, and further assumed no particular value for the water power plant. I am trying to find out what it is worth. I figure first my fixed charges of 9 1-2 per cent. on the cost of this remodelled plant, on \$104,400, which is \$9,918. Then I have taken the operating expenses, the labor item, from the testimony of Mr. H. A. Foster, which amounts to a total of \$4,470. Then I figure the supplies, repairs and miscellaneous expenses amounting to \$2,803, and that the fuel for the 62 days amounts to \$1,784. Then I have taken Mr. Main's figure of 190 horse power, which is practically 3 mill power, and at \$1,500 is \$4,500, less the restricted days on which a rebate is given, which is 30 days, which gives \$4,130 as the amount which would have to be expended for the water power, making the total operating expenses \$23,105. Then I have taken the cost to operate by steam the remodelled plant, and gone through it in the same manner. Fixed charges, \$9,918; operating expense, \$6,552; supplies, repairs and miscellaneous, \$3,038; fuel for the entire year, \$10,201; making a total operating expense of \$30,709, showing that the difference between operating this plant all the time by steam, and by steam 62

days and water 303, amounts to the difference between \$30,709 and \$23,105, which is \$7,604.

Q. What does that represent? A. That amount represents the fixed charges which could be paid on the water power plant provided you got the water power under the conditions which I have before stated.

Q. And in that case— A. In that case I figured the fixed charges on the water power plant at 8 1-2 per cent., the difference between that and the other fixed charge item being 1 per cent., which is due to the fact that I have allowed only 2 per cent. depreciation on the water power plant instead of 3 per cent. That, capitalized at 8 1-2 per cent., gives a result of \$89,458, which is the amount that could be paid for the water power plant if the city were allowed to pay, or required to pay, \$1,500 per mill power for measured water, and the operation by steam was 62 days and by water 303 days. That is on the basis also, further, that the city pays \$61,390 for the steam and electric plant, and expends in remodelling the plant, putting it in fit condition to run, \$43,010.

Q. That is, on the basis of the operating cost as set out on pages 22 and 23, if the water plant cost \$89,458, then the total expense of operating the combined water, steam and dynamo plants, including all fixed charges, would equal the expense of operating the steam and electric plant, including all fixed charges. A. Yes, sir.

The CHAIRMAN. The witness certainly has made his statement perfectly clear, and is running by this schedule. Is there any occasion for your asking a question of that kind? I know you do it from over anxiety to have the thing made clear.

Mr. GREEN. If you will pardon me, it may be it is, but this is the very form of calculation over which we have had so much trouble, and I doubtless do have some anxiety. It being clear to the Commission I do not know that I would repeat the questions in that form.

Mr. BROOKS. Why should there be a summarization at the end of a series of questions?

The CHAIRMAN. There is not. I do not see any occasion for it. It seems to me that the Commissioners are by this time sufficiently informed on these theories so that by the use of such

an elaborate schedule as this we may go on without using up so much time, but if counsel thinks it is necessary that is all right. We are not finding fault.

Mr. GREEN. We certainly do not desire to use up any unnecessary time.

The CHAIRMAN. I understand.

Mr. GREEN. With that suggestion of the Commission, I will proceed.

Q. Referring again to page 24, on the basis of the figures which you have already used, and supposing that the modifications, the changes, have been made that you suggested, whether or not the remodelled plant would operate as economically as a new plant? A. It would not operate as economically for one or two reasons. The testimony shows that on a particular day they made a test of this plant, and the coal consumption was 3.39 pounds per horse power per hour. With a good compound-condensing plant the coal consumption would certainly be reduced to 2.5 pounds of coal per horse power per hour in the remodelled plant. They still make use to a certain extent of shafting and belting, and there is considerable loss in the shafting and belting, and in some other minor ways, the question of arc lamps and the trimming of the same, and a smaller amount of outside lines to take care of, and in quite a number of other minor ways that should be taken into consideration.

Q. Have you made any further use of the figures which you have ascertained, the cost of operating by steam, of the present plant? A. I have, yes, sir.

Q. Will you explain them? A. I have carried the same thing a little further, the same deduction, on the assumption that the city could not afford to pay for operating the plant by water more than it would cost to operate the same plant by steam, which is the ordinary way that a matter of that kind is considered. The cost of operating by water 303 days and by steam 62, if you pay nothing whatever for water power, equals \$18,975.

Mr. BROOKS. May it please your Honors, is he not now, and has he not been for some time, testifying as to the value of water power mechanisms and water power?

The CHAIRMAN. I understand that he has taken the assumption of \$1,500 and used that for the purpose of his calcula-

tion. That is what I understand him. (To the witness.) Now you say the difference between the \$30,709 steam and \$18,975 water amounts to \$11,734, which capitalized amounts to \$138,047?

The WITNESS. Yes, sir. That \$138,047 is the amount that could be paid for the water power plant, that is, the water power machinery, if the power were furnished free—if they gave them the power.

Q. That includes the buildings and machinery and the privilege? A. It does.

Mr. BROOKS. I submit again he is testifying as to the value of water power. It must be so.

Mr. GREEN. We expect he is testifying as to the value of water power, the water power plant for the purpose of its use in connection with furnishing power to the electric light plant.

Mr. BROOKS. If our rights are reserved I do not know that we care to discuss it.

The CHAIRMAN. If you undertake to claim by this that this man is competent to testify to the value of water power in Holyoke, the Commissioners, I think, disagree with you.

Mr. GREEN. We discussed the same thing at some length when Mr. Warner's testimony came up.

The CHAIRMAN. Do you put it on the same principle that you did Mr. Warner's testimony?

Mr. GREEN. Yes, sir. We put it on the same principle that it is to be valued in this case as what it is worth to furnish power for an electric light station.

The CHAIRMAN. If that is the principle you put it on, we will admit it.

Mr. MATTHEWS. I do not think I understand your Honor, as to what is in your Honor's mind, exactly.

The CHAIRMAN. We are not going to let this witness testify as an expert as to the value of water power in Holyoke.

Mr. MATTHEWS. At large.

The CHAIRMAN. At large.

Mr. GREEN. We do not understand him so.

The CHAIRMAN. I do not understand him so. He is assuming that water power is worth \$1,500.

Mr. MATTHEWS. Not quite that. We do not offer the evidence of this witness upon the value of water power in Hol-

yoke per se, at large, for any purpose. We offer his evidence, just as we offered similar evidence from Mr. Warner, upon the value of water power in Holyoke for the purpose of furnishing power to run a central lighting station, and we claim that he is qualified to a far greater extent than a hydraulic engineer would be to speak on that particular point.

The CHAIRMAN. We passed on the same question yesterday.

Mr. MATTHEWS. That is what we understand, and that the evidence was admitted.

The CHAIRMAN. Yes; subject to your rights, of course.

Mr. BROOKS. Yes, sir.

Mr. MATTHEWS. I would like to say that we understand these witnesses stand exactly on the same footing with respect to this question as Messrs. Whitham and Green on the other side, not on the same footing as Messrs. Allen and Tower.

Mr. BROOKS. We do not understand they stand on the same footing.

Mr. MATTHEWS. I am simply stating our understanding of their qualifications with reference to this particular point.

Mr. GREEN. Is it clear to your Honor what is represented by the \$18,975?

The CHAIRMAN. Yes; but I do not quite understand what you are giving us on your \$138,047.

Q. Well, if you will explain that? That is just the same operation as a good many we have been going through. Will you explain that process again, Mr. Blood?

The CHAIRMAN. I do understand it. So far as I am concerned you need not explain it. I suppose you apply it somehow.

Q. Well, will you explain it again, Mr. Blood? A. I find out what the cost of operating the plant by water 303 days and by steam 62 days was.

Q. How much is that? A. And that is \$18,975.

Q. Where does that computation appear? A. That is on page 22, isn't it?

Q. That is, you have got on page 22, have you not, your 3 mill power of water computed? A. Yes, sir.

Q. That is \$4,130. If you subtract that from \$23,105 it leaves \$18,975, doesn't it? A. Yes, sir, that is correct.

Q. So that your amount of \$18,975 represents the cost of operating the two plants? A. 303 days by water and 62 days by steam.

Q. And omits all charge for water power? A. Yes, sir.

Q. As well as all price for the water plant? A. That is correct. Then the next process, on page 23, was to find what it cost to operate by steam.

The CHAIRMAN. Oh, yes, you have gone over that.

The WITNESS. Then the difference between these two amounts shows the difference in cost of operation on these two different assumptions, which amount, capitalized at 8 1-2 per cent. is the amount which we could pay for the water power plant if the water power, as power, were furnished free, with no charge whatever.

Q. Furnished without rental? A. Without rental, yes, sir. Then I have carried that one step further in the other case, and figured, if they pay nothing whatever for the water power plant, to see what the city could afford to pay for the water power, it being assumed that they utilize 3 mill power 303 days, that is, an average of 3 mill power, measured water; and that amounts to \$11,734, the sum of \$4,130 and \$7,604.

By the CHAIRMAN.

Q. Where do you get that latter? A. The difference between the cost of operating by steam and the cost of operating by steam and water. That comes from page 23.

The CHAIRMAN. Yes, I see.

By Mr. GREEN.

Q. When you say "water power plant" in these last two propositions on page 24, whether or not that would include the land? A. It would include the land on which the water power plant was located.

Q. Yes. The land, buildings, machinery and the privilege? A. The privilege also.

Q. I do not know whether there is anything in the various schedules of the buildings, the cost to reproduce new, that needs explanation. I will pass it at present, anyway.

The CHAIRMAN. You mean the cost of reproducing? That seems to be very full. Of course I have only glanced at it.

Mr. GREEN. Yes, "Cost to Reproduce New, Item by Item, Estimate based upon Quantities as Furnished by Company."

The CHAIRMAN. That runs from page 25 to page 44.

Mr. GREEN. Yes, from page 25 through page 44, inclusive.

Q. As to the percentage, in the schedule beginning on page 25, Schedule B, you have allowed for engineering and incidentals 10 per cent., and six months interest 5 per cent. A. I have, yes, sir.

Q. A total of 15 per cent. for interest and engineering. There is a little explanation that may help us, I think, in regard to your Schedule C on page 35.

The CHAIRMAN. That is another?

Mr. GREEN. That is part of the reproductive cost.

The CHAIRMAN. That takes it to page 44.

Mr. GREEN. Yes, sir.

Q. Will you explain just how you got at the reproductive cost of your machinery? A. You mean in Schedules B and C?

Q. There is no machinery, is there, in Schedule B? A. Some, not to amount to anything.

Q. Well, you can take it up in Schedule C, on page 35. A. Page 35 is a summary, of which the following nine or ten pages are the details, and in this schedule I have figured the cost to reproduce, from figures which I have learned to be correct from my general practice in electrical engineering and in contracting.

Q. What does "cost" represent, and what is the "labor and freight"? It may be obvious and may not be; I would like to have it appear in the record. A. The "cost" represents the price at which these goods can be bought, and the "labor and freight" the amount—the expenses of getting them from the purchaser to the plant and setting them up in operation.

Q. To the total of which you add 10 per cent. and 5 per cent.? A. Yes, sir.

Q. Turning to page 46, "Value of Apparatus and Machinery, if Depreciated on account of age and Condition only," where do you take your depreciation? Explain your method of depreciation. A. The matter of depreciation is a very large one, and I have considered it by examining the apparatus and ascertaining as far as possible the age and condition, and have also taken into consideration the progress in the art, the improvement in the

manufacture, and the suitability of the apparatus to do the work called for.

Q. On what principle do you make your depreciation? Take, for instance, the very first, the dynamos and armatures. You say "Value," and then you put "Labor and Freight." Have you depreciated the labor and freight, or is that the same? A. I have used the labor and freight item the same.

Q. That is, you depreciate— A. Simply from the original value of the machinery.

Q. The original cost of the machinery before set up? A. The original cost before set up, on the assumption that it would cost the same to set it up now, and the freight would be practically the same as it was when it was originally installed.

Q. I notice you add 10 per cent. in this case for engineering, incidentals and interest, whereas in getting at the new cost you use 15 per cent. Why is that? A. For the reason that this is a going concern and you know just what you have got here. You have not got any large amount of question of engineering. You have the question of superintendence, but the engineering feature of it is settled.

Q. Coming now to the cost of your new plant on page 56, represented by Schedule F, whether or not you have prepared any plans for buildings and stack, boiler settings and foundations? A. No, sir, I did not.

Q. Why do you say \$22,000 is the cost new of the buildings, stack, boiler settings and foundations? A. I know from my experience in building plants that a building of sufficient size to contain these units could be built in 1898 for this amount of money, \$22,000.

Q. And so far as the engines, dynamos, condensers, and various other machines and equipment that you have stated in this schedule, what have you to say as to the method of getting at the cost of those? A. I figured out in all cases on those what would be necessary for the operation of a modern plant of this size and quality, and estimated the cost of such apparatus and machinery in place, and allowed a proper amount for increase, that is, a proper amount of room in the building for increase, and sufficient capacity in all the apparatus, engines and dynamos and boilers, to take care of the more than maximum load, and still

make a plant which is built in accordance with good engineering practice.

Q. Did you have actual personal experience in laying out a plant using the economizer, for instance, as suggested in this schedule on page 56, so as to know what it cost? A. I have had actual experience in laying out a number of entire plants covering substantially the same apparatus as is included in this.

Q. And whether or not along in 1897 or 1898 or 1899, along about this time, you were building plants, laying out plants or engineering plants of this general type, or remodelling them or something of that sort? A. Just at that time I was not contracting for plants, that particular year.

Q. What particular year is that? A. 1898.

Q. Have you since then? A. I have since then, yes, sir, and before then also.

Q. Before then and since then? A. Yes, sir.

Mr. GREEN. I think that is all I care to ask this witness until after Mr. Warner returns. There were two additional schedules, a part of this, that were not out of the typewriter's hands this morning so that we could put them in. I understand Mr. Brooks does not care to cross-examine Mr. Blood until we are through with Mr. Warner, and I ask the Commission to suspend at this point.

The CHAIRMAN. Very well.

(Adjourned to Friday, Dec. 21, 1900, at 10 A.M.)

(By agreement of counsel, the remainder of Mr. Blood's testimony, given at the fifty-second and fifty-third hearings, are printed at this point for convenience.)

FIFTY-SECOND HEARING — Continued.

BOSTON, Saturday, Dec. 22, 1900.

WILLIAM H. BLOOD, JR., *resumed.*

Direct examination by Mr. GREEN, continued.

Q. Whether or not, Mr. Blood, at my request you have made a detailed estimate of the depreciation which you allowed of the parts which in your opinion could be retained for use in the present electrical plant? A. I have made such a table.

Q. Have you a copy of it here? A. Yes, sir; schedule H.

Mr. GREEN. I should like, without going through it at all, to offer it in evidence. It is all shown in the other schedules, but for the sake of convenience I have it by itself.

The CHAIRMAN. Very well.

(The sheet, headed "Depreciation of parts which are to be retained for use," was marked by the stenographer "Ex. 150, E.L.D.," and the same is printed at the end of Mr. Blood's schedule, Ex. 139.)

Q. Whether or not you have computed—I don't want any schedule for this, but simply the amount—whether or not you have computed the amount of money which in your opinion could be received for the parts which you believe should be discarded on account of lack of efficiency and excessive cost of operation?

A. Yes, sir; I have made that calculation.

Q. And what does it amount to?

Mr. BROOKS. (To the stenographer.) Will you read me that question. If it is what I think it is, I shall object to it.

(The question, "Whether or not you have computed—I don't want any schedule for this, but simply the amount—whether or not you have computed the amount of money which in your opinion could be received for the parts which you believe should be discarded on account of lack of efficiency and excessive cost of operation," was read by the stenographer.)

Mr. BROOKS. I object to that question.

The CHAIRMAN. Well, we should be glad to hear you on it.

Mr. BROOKS. One reason is, I do not understand it,—I probably do not understand it, and another reason is, it seems to me it raises the whole question of whether or not they shall have the right to take out our machines and replace them,—

The CHAIRMAN. Well, we have already discussed that.

Mr. BROOKS. And we should want our rights saved upon this phase of it.

The CHAIRMAN. Very well; we will consider this to belong to that same class of testimony that was objected to. We will let this go in.

Q. What is the amount? A. \$6,163.

Mr. GREEN. It is, in other words, a summarizing of the value which he gives to the parts which he says in his opinion he would have to discard.

Mr. BROOKS. Just give me that figure?

The WITNESS. \$6,163.

The CHAIRMAN. Does that complete your direct examination?

Mr. GREEN. Except possibly two or three questions that may be suggested by Mr. Matthews' notes.

(Recess till 2 P.M.)

AFTERNOON SESSION.

WILLIAM H. BLOOD, JR., *resumed.*

Direct examination by Mr. GREEN, continued.

Q. Mr. Blood, whether or not in your opinion the parts of the plant that you have considered, other than the dynamos, which you have valued as not for future use, are suitable in your opinion for the purpose of their use in an electric light plant?

Mr. BROOKS. This, of course, goes in subject to our objection and exception.

A. Some parts I considered as unsuitable.

Q. Did you understand my question? Certain parts of this plant you have valued for future use and other parts you have valued simply at a removal value. Whether the parts that you have valued at a removal value are in your opinion suitable for the purposes of their use? A. I didn't understand you. No, the parts I valued at a removal value are not suitable for their use.

Q. I take it in that way, generally, so as to cover them all without enumerating them. A. Yes, sir.

Q. Whether or not these buildings as they are there at present, are, in your opinion, suitable for the purpose of their use in connection with the generation of electricity? A. I do not consider them suitable.

Q. A picture was brought here this morning of a transformer. Will you tell the Commission the name of that transformer, and explain how it operates, and show whether there is much mechanical action in it or not? A. This is a transformer which transforms the electrical current at a constant potential or constant pressure to an electrical current of constant current. It is commonly called a tub transformer. It is not nearly as complicated as it looks on first sight. These wires around here, in actual use run off straight, and, as a matter of fact, there is very little of moving parts to it. The only motion in it is the motion of two coils,

one up and the other down—both coils up and down. These movements occur very slowly, and sometimes while this transformer is in use there will be practically no motion for half an hour or so, and when there is any motion it is a motion which is very slow and gradual. This whole arrangement below what looks like walking beams is immersed in oil, and the movement of these coils in the oil is necessarily slow.

Q. Just to call your attention to that for a moment, you spoke of two coils. Will you examine it more closely and see whether there are two or four coils? A. On this particular size—I don't know what size this represents—I think there may be four coils. I think there are from the looks of this photograph, which is not very clear.

Q. Did you state the name of that transformer? A. It is called a tub transformer.

Mr. BROOKS. It is the one Mr. Warner testified with reference to.

Mr. GREEN. Yes. What is the exhibit number?

The WITNESS. Exhibit 149.

Q. Lay that one side now. You start with the figure of two hundred and some odd thousand dollars as the reproductive cost of this property new. Do you remember the figure? A. \$247,426.

Q. Then you depreciate that, on account of age and use, to another certain figure. A. \$180,215.

Q. Have you separated from those figures the depreciation for age and use only of the steam and electric plant—I think you have it somewhere—not considering the water plant?

Mr. BROOKS. Please give us the page when you get around to it. I haven't looked at this schedule at all.

The CHAIRMAN. I thought you had been over this once.

Mr. GREEN. No, not this.

Q. Without finding just what the figure is for those two, you depreciate it to a certain point for age and use only, and then you give us a third figure. The \$180,215 covers the three, doesn't it? That includes the water plant? \$180,215 includes the water plant? A. That includes the water power machinery.

Q. And buildings? A. Yes, sir.

Mr. BROOKS. I would like to know whether it does include the water power plant or not.

The CHAIRMAN. You went into this, as I understand, pretty exhaustively.

Mr. COTTER. I understand it is water power machinery, not the water power.

Mr. BROOKS. The water power machinery and water power plant are really distinct things.

The CHAIRMAN. Of course I cannot carry it in my mind, all of it.

Mr. GREEN. The point I want to bring out I have not asked about.

Mr. BROOKS. Is the water power plant included?

The CHAIRMAN. This is the cost to replace new the electric light and power plant, including water power machinery, buildings, steam and electric plant, exclusive of land.

Mr. GREEN. Everything but land is in that.

Mr. BROOKS. In the \$180,215?

Mr. GREEN. That is depreciation for age and use.

Q. Then you gave us another result, which is less than that, of \$61,390 for the steam and electric plants, and of \$150,848 for all three plants combined.

Mr. BROOKS. Where is that?

Mr. GREEN. I don't know where it is.

Q. What is the further depreciation allowed for by you? A. Depreciation on account of the unsuitability of the apparatus, and the unadaptability, if I may use the word, of the buildings and some other parts.

Q. The first depreciation you take from the age and the condition of it, and the third depreciation is found from the efficiency and the expense of operation? A. Largely, yes, sir.

Mr. MATTHEWS. Is it the third?

Mr. GREEN. It is the third, really. There are two in one. Age and condition first, and then a further depreciation for efficiency and expense of operation.

Q. Will you tell us the fair market value of the electric, steam and water plants of the Holyoke Water Power Company, assuming that the purchaser can draw up to 16 mill power of water, and pay at the rate of \$1,500 per mill power per annum for such water as he uses, in other words, measured water? A. Taking all those things into consideration, I estimate that to be \$150,796.

By Mr. COTTER.

Q. That appears on what page in your schedule? A. I don't think that is on any page, sir.

By Mr. GREEN.

Q. Whether or not in your opinion these plants combined have any value for the purpose of their use in making and distributing electricity, if the purchaser has to pay \$72,000 for the land and the privilege of drawing the water, and \$24,000 a year for the 16 mill power? A. As a plant, no.

Q. Whether or not the combined plants have any value for the purpose of their use as before described, if a purchaser or the owner has to pay \$72,000 down as bonus, and \$12,000 rental for 8 mill powers?

Mr. BROOKS. Do these show on this schedule at all?

The CHAIRMAN. He certainly testified to this the other day unless I have got mixed up with somebody else. Haven't you, Mr. Witness?

The WITNESS. I don't think so.

The CHAIRMAN. Then I have got you mixed up with somebody else.

Mr. BROOKS. What pages of your schedule does this calculation appear on?

The WITNESS. Not in the schedule.

The CHAIRMAN. I beg your pardon. I thought I looked through the thing carefully, but probably I didn't. Go on, Mr. Green.

(The last question was read by the stenographer.)

A. No.

Q. And what would you say as to the same question, modified by the payment of \$36,000 down for the land and privilege and \$12,000 per annum rental? A. I still think that that would be practically no value.

Mr. GREEN. I wish to have this drawing, together with the stickers on it, marked. I offer that in evidence and would like to have them marked as an exhibit.

(General plan of the Holyoke Water Power Company's electric light and power plant, with stickers attached thereto, marked "Exhibit 151, W.L.H.")

Cross-examination by Mr. BROOKS.

Q. You were shown a photograph a few moments ago, Mr. Blood. Did you ever see before today the inside of a 100-light transformer of that kind? A. I haven't seen one today that I know of.

Q. You have seen the counterfeit presentment of one, haven't you? A. Yes, sir, I have seen one before today—the photograph and cuts.

Q. The inside? A. Yes, sir.

Q. Have you ever seen the inside of the actual transformer? A. No, sir, I have not.

Q. Now you have given certain figures here under two or three propositions, by which the electric plant would be worth nothing, in substance, as I understand you? A. Yes, sir.

Q. And those are the propositions that are not detailed in your schedule, but are given in Mr. Warner's schedule? A. I don't know anything about Mr. Warner's schedule.

Q. Haven't you seen it? A. I have not.

Q. Haven't you heard it testified to? A. I have heard his testimony, yes, sir.

Q. How did you arrive at your conclusion or conclusions with reference to these three propositions or three combinations that you have just given? A. I considered, along with the other operating expenses of the plant, those various amounts of bonus and annual cost of power, and, taking those into consideration with the other operating expenses, I saw that it would not be advisable to pay such prices in the operation of that plant, where it could be operated cheaper otherwise.

Q. That is, you mean by that, that in your mind's eye you set up a modern plant? A. No, sir.

Q. I had hardly finished. And you compared the real, existing plant with what you think a modern plant could be operated for? A. You are incorrect in your supposition.

Q. Well, I haven't had, to my mind, any sufficient reason furnished me for these results. How do you arrive at your conclusions, what do you take for the basis, and what are your processes by which you reach these three adverse conclusions? A. I take the operating expenses of the present plant as they are detailed in

my schedule, and consider in connection with them, as I stated, these various bonuses and various amounts per mill power per year, and, as I said before, I see that it would be impracticable to pay such prices.

Q. How do you reach that? How do you know? Where are your details for it? A. I have no details with me. I have worked that out and those are the results that I arrived at.

Q. Where is the process of your working out? You have worked it out, you say. Show me your processes in which your workings out consisted. A. I don't know that I can make it any plainer, except that I added in those facts, so much for bonus and so much for mill power; add those on top of the other operating expenses, and you find it is very much more than you could operate the same plant for by steam.

Q. Show me your workings out. A. I haven't them with me.

Q. Where are they? A. I destroyed them after I figured that out.

Mr. BROOKS. There is another gone up in smoke.

Mr. GREEN. It could be figured in about four minutes.

Q. Of course you expected to testify after you were retained in this case? A. I did, yes, sir.

Q. Didn't you think that it might be possible that somebody would inquire for the processes which gave you a certain result?

A. I did not know that I was going to be questioned on these particular points.

Q. What? A. I did not know that I was going to be questioned on these particular points. If I had I would have brought the figures with me.

Q. They are destroyed. When did you work out your processes by which you arrived at the results you speak of? How lately? A. I began that something over a year ago and finished them—

Q. When did you work them out? I do not ask you when you began them. When did you work them out? When did you get your results by the working up of your processes? A. I think I completed everything except the schedule H about two weeks ago.

Q. Now I do not know anything about schedule H, because

I have had no opportunity to look into this schedule of yours; we sent it out to have it copied, and I borrowed one. I am talking now about these three combinations or propositions to which the last inquiries of my brother upon the other side were directed. When did you work out your processes by which you were enabled to answer the question that he put to you today? A. I think I completed my work about two weeks ago.

Q. And then destroyed the calculations and the processes? A. Of those three or four that I stated had no value.

Mr. BROOKS. Yes.

By Mr. GREEN.

Q. Is not the first of those in your schedule here—the \$24,000 rental and \$72,000 down proposition—is not that here in your book? A. One of those propositions has been worked out and is in the schedule or the exhibit.

By Mr. BROOKS.

Q. What page?

Mr. GREEN. Look at page 19 and look along to pages 21, 22, 23, and so on.

A. The conclusion is on page 24.

Q. You reach your conclusion on page 24 by comparison with a so-called modern plant, don't you?

Mr. GREEN. 15 and 16, Mr. Brooks.

Mr. BROOKS. And 24; his conclusions are on 24. That is what he says substantially.

A. No, sir, not exactly. The present plant remodelled.

Q. Well, it is the present plant as you would have it under what you consider modern conditions? A. Yes, substantially correct.

Q. Is not that right? A. Substantially correct.

Q. And did you reach your other conclusions in the same way? A. I think not; I think I took—

Q. Well, do you know? A. As I remember it, I took the plant as it is.

Q. And you made no comparison such as you made on your first proposition, the results of which are on page 24? A. I do not remember, sir.

Q. You cannot tell? A. I cannot tell.

Q. And you cannot tell me, then, how you arrived at these conclusions? A. Not any clearer than I have told you, sir.

Q. Where do the processes, I am requested to ask you, which give the conclusions as you claim, as stated on page 24, begin?

A. I think the first figures in reference to that are on page 21, except the references that I have made to testimony by H. A. Foster, which are Volume 4, page 22.

Q. Volume 4 of the testimony? A. Yes, sir, of the testimony.

Q. Your processes which you claim give certain results on page 24, start on page 21? A. Practically, yes, sir.

Q. And do the intermediate steps of the process appear on the intervening pages between 21 and 24? A. Some of them, yes, sir.

Q. Well, "some of them"; where do the others appear that give you the result on page 24? That is, where do they appear in your schedule? A. They substantially appear there.

Q. Do they appear anywhere else? A. Practically no.

Q. What do you mean by that? A. Well, I mean just this: For instance, that under the words "fixed charges—the amount \$104,400—that comes from some other place and it does not appear there for the first time. I also mean that in that fraction under the word "fuel"—

Q. What page? A. The same page, 22. I have not shown the working out of that fraction, the cancellation, multiplication and division. I mean substantially the work is all there, including those pages.

Q. Well, that does not appear anywhere else? A. The working out of that fraction.

Q. —in your schedule? A. Do you ask that as a question?

Q. Yes, I am putting it as a question. A. Why, no. The working out of that was done on a scrap of paper and thrown away.

Q. You do not take earnings into account at all? A. No, sir.

Q. In your determination with reference to the value? A. No, sir, I do not.

Q. You have drawn no plan? A. I have not.

Q. Have Mr. Warner and you talked together in reference to this case? A. No, sir, only in a general way.

Q. You are employed by Stone & Webster? A. Yes.

Q. And you have been in their employ since what time? A. Since a year ago the first of February.

Q. That is, February, 1899? A. Yes.

Q. Did you go up there to examine this plant after your employment by Stone & Webster? A. I did, yes, sir.

Q. Then it was in 1899 that you went to the plant for an examination? A. Yes, sir.

Q. The first time? A. Yes, sir.

Q. You said the other day it was 1898, and I think very likely you made a mistake in the year. A. No, sir, I did not say so. I said I saw the plant in 1898, and I did.

Q. Well, for the purposes of making any examination of it, or putting any value upon its structure? A. No, sir.

Q. What did that mean, your seeing the plant in 1898? What significance did you think that had in this case? A. I was coming through there on a canoeing trip, and being in electrical matters and knowing nothing whatever about this case, saw the wires, and in fact I walked all over the town to see the town and took particular notice at that time of the wretched condition that they were in and the rotten poles and the overloaded poles, overloaded with wires; and it struck me that it was about—

Q. I did not ask you whether it struck you. If you want to put it in, why, let the strike come in. A. It appeared to me, as I was in that particular line of business, a pretty tough proposition.

Q. Did you go inside this plant to make any examination of the mechanisms in 1898? A. I did not, no, sir.

Q. Nor any part of the plant? A. I did not.

Q. Of course you made no report to anybody? A. In 1898?

Q. Yes. A. I did not.

Q. And you made no memoranda with reference to what you saw? A. Only a mental memorandum.

Q. When did you get engaged in this case? A. Do you mean me personally, or Stone & Webster?

Q. I meant you. I will come to the other later on. A. It was about a year ago; I cannot say exactly.

Q. About a year ago now? A. Yes, sir.

Q. When were Stone & Webster retained in it? A. I do not know, sir.

Q. You knew they had been retained in it? A. I did, yes, sir.

Q. And Mr. Stone or Mr. Webster or both had made examinations of the plant? A. I do not know, sir; I do not know so.

Q. That is, you did not see them? A. I do not know—

Q. Don't you know it is so from your talk with counsel? A. No, sir, I do not.

Q. Or with Stone & Webster? A. No, sir, I do not.

Q. Who sent you up there? Stone & Webster? A. I went under their orders, yes, sir.

Q. Who pays you for your services? A. Stone & Webster.

Q. And you say that you did not know that Mr. Stone or Mr. Webster had ever been up there and looked at that plant or made any examination of it? A. I do not know that they have.

Q. Saw no figures of theirs? A. I do not know that I have, no, sir.

Q. See any figures of theirs? A. I have not.

Q. Have you talked it over with either Mr. Stone or Mr. Webster? A. I have.

Q. When did you begin talking it over with them? A. I cannot tell.

Q. Well, about when? A. Sometime during the past year; possibly nine or ten months, I should think.

Q. Which one of them was it that you talked with? A. Mr. Stone.

Q. Didn't you go in with him into certain calculations? A. Certainly.

Q. How much of this schedule is the result of your own thought, separated from the thought of Mr. Stone? A. Practically all of it.

Q. Did you discuss with him the various phases of the case? A. I think I can say no.

Q. Well, you think you can— A. Yes, no; I will say no.

Q. Didn't you go over with him the question of valuations? A. I have to a certain extent.

Q. Both made figures? A. I think he made none at that time that I talked with him.

Q. Well, did you both make figures, whether it was at that time or other times? A. Why, yes, I suppose so.

Q. Were your calculations, these calculations here, more or less the result of the combined thought of the two of you? A. No, sir, they are not.

Q. You rejected his, did you? A. No, sir, I did not.

Q. Did you accept them? A. What?

Q. His? A. His what?

Q. Calculations and his results? Stone's? A. I cannot answer that question without an explanation.

Q. Well, I ask you now, did you accept or reject Mr. Stone's calculations or conclusions?

Mr. GREEN. If it needs an explanation I suppose he is to be allowed to give it. Maybe it is not a question to be answered by yes or no; it assumes a good deal.

Mr. BROOKS. I assume nothing.

Mr. GREEN. Well, I say it does assume something.

Mr. BROOKS. I dispute it.

The CHAIRMAN. Mr. Witness, you may answer the question in your own way as near as you can.

Mr. BROOKS. All right.

The CHAIRMAN. I mean, answer the question pertinently and directly as near as you can.

A. I talked over the matter, your Honor, with Mr. Stone, in a general way. I think I went into details with calculations with him practically not at all.

Q. That is not my question. Did you accept or reject the conclusions of Mr. Stone? A. I did neither.

Q. Did not either accept or reject them? A. No, sir.

Q. Was there another man employed by Stone & Webster on this job? A. There was.

Q. Who was he? A. Mr. Robb.

Q. Where is he now? A. You mean where does he live?

Q. Yes. A. He lives in Concord at present.

Q. In which? A. Concord, Mass.

Q. Is he now in the employ of Stone & Webster? A. He is.

Q. Did he go there with you? A. He did not.

Q. Did he go there and make an examination of the plant? A. I think he has done so.

Q. Well, there isn't any doubt about it, is there? A. What is that?

Q. There is no doubt about it in your mind, is there? A. My only source of information is that he has talked at times as though he had; I did not see him go.

Q. Do you know how many times he went up there and made an examination of this plant? A. No, sir, I do not.

Q. For Stone & Webster? A. I do not know.

Q. Did he make certain figures and calculations? A. He may have.

Q. May have? I am asking you if he did.

Mr. GREEN. Just a moment. I think that the witness can only testify as to what he knows and not what anybody has told him.

The CHAIRMAN. That is right.

Mr. GOULDING. He cannot answer by general possibilities when he is asked a question. He can say he does not know if he wants to.

The CHAIRMAN. He can say he does not know if he does not know. What was the question?

(Question read: "Did he make certain figures and calculations?")

Mr. MATTHEWS. We object to that question on another ground. I suppose a witness may be asked on cross-examination with whom he has associated, with whom he has figured or talked, for the purpose of enabling the court to determine what credibility to attach to his opinions. But I do not understand that this witness can be asked what somebody else did so that that fact may go in as a substantive bit of evidence. Witness A cannot testify that Witness B was retained as an expert on value, for two reasons: In the first place, it is not competent in itself; and in the second place, it is not the best evidence of the fact itself, if the fact be competent.

Mr. BROOKS. It is.

Mr. GOULDING. Suppose, your Honor, if Mr. Matthews is through—

Mr. MATTHEWS. Yes.

Mr. GOULDING. Suppose it is our theory that this man has produced this schedule from the figures of somebody else, to wit, Mr. Robb—I do not say that he has or has not—and we are in cross-examination endeavoring to bring out that proposition,

which your Honor does not know whether we are or not. We ask him if Mr. Robb made any figures—of course of his own knowledge; if he does not know anything about it he will say so. And the next question might be, "Didn't you copy them on to your schedule?" Are we to be limited in cross-examination?

Mr. MATTHEWS. I should say with that explanation we should have no objection to your putting the question for that purpose.

Mr. GOULDING. Shall we explain every time we ask an ordinary question that every man that ever tried any cases knows—

Mr. MATTHEWS. The trouble is that the question has been put before for a different purpose.

(The question was read again.)

A. I think he did.

Q. You know he did, don't you? A. Limiting the word "certain," yes.

Q. Why can't you give me a direct answer?

Mr. GREEN. Just a moment. I think he has given him a direct answer, and I do not think that is a proper question to put to the witness.

Mr. BROOKS. I will insist on the question.

The CHAIRMAN. Put the question, Mr. Brooks.

Q. Why didn't you give me a direct answer?

Mr. GREEN. Just a moment; I object. That assumes something. It is not a fair question to the witness.

The CHAIRMAN. There seems to be some difficulty about the word "certain," Mr. Witness. You can answer this question without any discussion.

A. I will answer it, then, by saying he did make certain trivial calculations.

Q. Oh! Yes. Was that after his examination of the plant?

A. Yes, sir.

Q. Did you understand he made an examination of the books of the Holyoke Water Power Company? A. I think he did—make a partial examination of the books.

Q. I did not ask you whether—very well. Was it after his examination of the books? A. It was.

Q. That he made certain figures? A. Yes.

Q. Have you consulted with him or talked with him, or he with you, with reference to this electric plant and the valuation of it or of its parts? A. I have.

Q. Did you reject or accept any processes or conclusions that he arrived at? A. I did neither.

Q. He, I think you say, is living? A. He is.

Q. How many times did you visit this plant after the retaining by the city of the firm of Stone & Webster? A. Once.

Q. And that was some time about a year ago? A. In that neighborhood.

Q. How long did you spend in inspection of this plant and its examination upon that one visit? A. All one afternoon.

Q. All of one afternoon. Who went with you in the way of electrical sellers or so-called electrical engineers? A. Mr. Warner and—I think that is all in answer to that question.

Q. No one else that had, so far as you know, any special knowledge of electricity or the various elements that go to make up this plant? A. Part of that question can be answered no and part yes.

(The question was read at Mr. Brooks's request.)

Q. Which part do you—take your choice on the two parts; tell me which you are going to answer yes and which no. A. I will answer the first part—well, there were two or three other men there.

Q. Who were they? A. Mr. Kirkpatrick and one of the representatives of the Water Power Company part of the time.

Q. Who else? Was Ridlon there at that time? A. No, he was not; that is all that I saw.

Q. That is all you recall at the present time? A. Yes.

Q. Didn't you and Mr. Warner talk it over then and thereafter? A. We did talk over in a general way the condition of the plant.

Q. Did you lay out any scheme of valuation? A. We did not.

Q. Did you at that time? A. I think not.

Q. You did not lay out any scheme of valuation here until you had talked with Mr. Stone and Mr. Robb, Stone & Webster's employee, did you? A. Yes, sir, I did.

Q. When did you first lay out your scheme of valuation? A.

For certain parts of it, as soon as I started on the work, soon after coming back from Holyoke, and then I elaborated it as I went along.

Q. Do you mean to say that this scheme of valuation was gotten up before you had had any talk with Mr. Stone or Mr. Robb after your return from Holyoke? A. Yes, sir.

Q. Didn't you talk with Mr. Stone with reference to your trip to Holyoke and what you saw? A. I do not think I ever said a word about it.

Q. Or with reference to the plant or the valuations? A. I do not remember going into details with him about it at all.

Q. I am not asking you about the details. Didn't you talk with him with reference to it almost immediately upon your return from Holyoke? A. No, sir, I did not.

Q. Who went up there first, you or Robb? A. Mr. Robb.

Q. How long ahead of you was he in the plant? A. I do not know.

Q. Was it months? A. I do not know; I have no idea when he went up there.

Q. Do you claim to be a hydraulic engineer? A. I do not.

Q. Do you claim to be a steam engineer? A. To a certain extent.

Q. What steam plants have you ever planned that were built upon your plans? A. I think all the steam plants in the list of plants which I named the other day.

Q. Where in New England did you make a plan of a steam plant that was built upon your plans? A. In New England?

Q. Yes. A. A complete plant—I made one in Bangor, Maine, and—

Q. That was built in accordance with your plan?

Mr. GREEN. Don't interrupt him, Mr. Brooks. He has not got through.

Mr. BROOKS. Very well.

Q. One in Bangor? A. As an entire plant, I think that is the only one in New England, although I have—

Q. I am asking you now about the plant. A. Part of a plant—

Q. How much of a plant was that in Bangor? A. What do you mean in that question?

- Q. What size was it? A. The size of it?
- Q. Yes. A. It was 600 kilowatts.
- Q. Is that used for electric lighting? A. It is not.
- Q. What is it used for—a railway? A. Yes, sir.
- Q. What electric lighting plants in Massachusetts have you planned that were built in accord with your plans? A. In Massachusetts?
- Q. Yes, sir. A. Plants as a whole, you mean?
- Q. Yes, sir. A. I have none.
- Q. Have you bought any engines for electric lighting plants?
- A. I have.
- Q. For electric lighting plants in Massachusetts? A. Oh, no, not in Massachusetts.
- Q. In New England? A. Yes, sir.
- Q. At Bangor? A. Yes, sir.
- Q. Any other place? A. Not—
- Q. I said electric lighting, but— A. In all those I said myself—I mean as an employee of Stone & Webster.
- Q. I am talking about you. A. Personally?
- Q. Yes, sir. A. And paid for myself, you mean?
- Q. Oh, I did not ask about their being paid for; I would not ask such an impertinent question as that. A. I do not know now what you mean exactly; that I have bought for my own self—
- Q. Have you ever purchased or sold engines and boilers for electric lighting plants in New England? A. It is very hard to answer that question as an employee of a company without—
- Q. Well, if it is very hard, let it go. Was the Bangor plant your design or the design of Stone & Webster? A. It was my design.
- Q. Were you then in their employ? A. I was.
- Q. When was that that you claim to have designed the Bangor plant, not for electric lighting but for street railways? A. A large part of the work was done on it last June and July.
- Q. This very year? A. Yes, sir.
- Q. Whose name did those plans bear? Who appeared on the plans as their designer and the author? Was it you or Stone & Webster? A. I think everything—the name of Stone & Webster appeared on the plans.

Q. I notice in your schedule, your schedule begins, "Stone & Webster, Electrical Experts and Engineers." A. Naturally, as I am in their employ, I use their paper.

Q. I am not caviling about it at all. On pages 56 and 57, which purport to be the cost of a new plant—and by new plant you mean, do you not, a so-called modern, or, as I term it, ideal plant? A. I guess that hits it.

Q. I see that upon pages 56 and 57 you have given the cost of your ideal plant. Am I correct? A. That is correct, yes.

Q. What have you got the ideal plant in there for? What do you use it for? A. I have used that to get at the cost of operation.

Q. You use your ideal plant, do you not, for the purpose of determining the value of the present plant, by comparison? A. That is correct.

Q. And, in your opinion, that is the true way to determine the market value of a plant? A. That is a correct way, yes, sir.

Q. And that is the only way, so far as your schedule shows, that you arrive at your final conclusion as to the value of the present plant? Am I correct about that? A. I don't think you are, quite.

Q. In obtaining the value of your present plant did you not use for that purpose the cost of a new, ideal or so-called modern plant? A. Not entirely, no, sir.

Q. Well, you certainly do as to cost of operation? A. I do in getting the cost of operation.

Q. Do you not with reference to advancements in the art? A. To a certain degree.

Q. Well, you do to every degree, don't you? A. No, not altogether.

Q. Well, you claim, don't you, that this plant is the best thing out? A. Yes.

Q. Your ideal plant? A. I don't mean to say "yes." It is designed in accordance with good engineering.

Q. With what your ideas of good engineering are. I do not say they are bad, I do not pass on that. You take that and you start with what it is going to cost to build this new plant and get it to running, don't you? A. Yes.

Q. And from that you determine what the value of the present plant is, don't you? A. That is one way, yes.

Q. Well, it is the way, isn't it? A. One of the ways which I have used.

Q. Did you determine the value of this present plant except as you take into consideration the cost of the so-called new, ideal or modern plant? A. I do, yes, sir.

Q. Where does that appear? A. It appears in schedule A, where I get at it directly.

The CHAIRMAN. Schedule A?

The WITNESS. Yes, sir.

Mr. BROOKS. Now let us see a minute about that.

Mr. GREEN. It is page 5.

Q. Don't you take, my friend, into consideration there, the operating expenses of your new plant? A. No, sir, I do not.

By the CHAIRMAN.

Q. Well, that schedule A is an estimation of market value, isn't it? A. Yes, sir.

Q. The structural market value? A. Yes, sir.

By Mr. BROOKS.

Q. Well, that is second hand; that is the junk or second hand market valuation, isn't it? A. No, sir, it is not.

Q. Do you mean to say that in schedule A you value this plant as a running plant? A. Yes, sir.

Q. Is that the way that you think your concern, or you, would have valued it for the purpose of bonding it? A. Most assuredly no.

Q. Or for the purpose of sale? A. Sale of what, sir?

Q. Sale of the concern and all that went with it. A. I don't know what you mean by concern.

Q. Well, honestly, don't you? A. I do not, no, sir. I have been trying ever since yesterday to find out what you meant by concern.

Q. Are Stone & Webster promoters? A. I don't know them in that sense, no, sir.

Q. Well, don't you know what "promoter" means? A. I said I didn't know them in that sense.

Q. Well, are they? I don't mean with reference to you, but are they? A. I don't know, sir.

Q. You never have known of their promotion of electrical

companies, being interested in consolidations and combinations?

A. They often are employed in that work.

Q. Well, now, let me see here for a minute. If you were called upon by Stone & Webster, for the purpose of the sale of the entire concern, to put a value upon the concern, would you have put this value that you have stated here in schedule A? A. Do you mean by "concern" stock and bonds, or the plant?

Q. I mean something more than the structure. I mean also as well what that structure produces.

Mr. GREEN. I object to that question. It does not seem to me that it is a question the witness can answer. I don't know what is intended by "concern," and I don't believe the witness does.

Mr. BROOKS. I don't suppose he will now.

The CHAIRMAN. It seems to me admissible.

Mr. BROOKS. I am going to stick right to this question, if I can.

The CHAIRMAN. If you cannot answer it, Mr. Witness, you can say so.

A. I cannot answer it intelligently from the description he has given.

Q. If Stone & Webster said to you, Here, we own a plant, an electric plant, it produces us so much money, we want to sell out our interest, would you have made your valuation in accordance with the method that you employed here in schedule A? A. If their interest consisted of stock and bonds, I would not.

Q. Can't you answer that question? A. No, sir.

Q. That is plain enough, isn't it? A. No, sir, it is not plain.

(The preceding question, "If Stone & Webster said to you," etc., was read.)

Q. Do you say that you don't understand that question? A. No, I don't say that.

Q. Then if you understand, please answer it. A. It would depend on what they asked me to value.

Q. Is there any doubt about it? (To the stenographer.) Read him the question once more.

(The same question was read.)

A. I wouldn't have made any valuation with those instructions.

Q. Supposing you owned the plant yourself, the business, everything that went in it, and you were the sole owner, and you came to the conclusion that you wanted to sell out and cease to be engaged in the electrical business, that the plant was producing you a certain sum of money and profit, say 40 per cent., or \$20,000 odd net, would you have sold out on the basis that you value the plant here? A. Sold what, sir?

Q. Do you say you don't understand that question?

Mr. GREEN. Wait a minute. We desire to object to that. It is the same assumption which has been put into the question before. "This plant earns you so much money." Now that is the difficulty any witness will have with the question, and it is not a fair question for the witness. It is not the plant that earns him a sum of money. It is the plant and the right to do business and other things that go with the plant.

Mr. GOULDING. I think such an explanation to the witness, to enable him to argue, is entirely irregular and improper.

The CHAIRMAN. Mr. Witness, take the question, and if you understand it, answer it, and if not, say you do not. We think it is admissible.

A. If I were selling nothing but the plant, I would.

Q. Do you understand? Do you think that is a fair answer to my question? A. I don't think that tagged on makes any difference.

Q. Well, let us see if I can put it this way. Supposing you owned this plant yourself, instead of the Holyoke Water Power Company; that it brought you \$23,000 a year; that you desired to sell out, if you could sell out, advantageously, I assume, and sever your connection with the electrical business; that it gave you net \$23,000 a year; would you sell out your entire interest for \$61,390? A. If I had nothing but the plant to sell, I would sell that part of it for that.

Q. Do you think that is quite an answer to my question? A. I think it is as straight an answer as I can give you, yes, sir.

Q. That is, if you wanted to sever your connection with the electrical business, and you had a plant that was producing you an income, a net income, you would say that you would sell your entire interest for the structural value of the plant, would you?

A. As I before said—

Q. Can you answer that question, or can't you? A. If you will define the word "plant," I will answer it.

Q. Do you say you don't understand that, sir? A. In the true sense, I don't know what you mean.

Q. Very well. My friend, leave out the electrical part of it for a moment. Supposing that you owned a paper mill that was producing you \$23,000 a year net, would you sell out your whole connection and your whole interest for \$61,390? A. That depends entirely upon the conditions, which I should want to know.

Q. Well, if it had been producing you \$23,000 right along, no cessation of net income in sight, would you sever your interest and sell it out for \$61,390? A. I don't think that is a comparable case.

Mr. BROOKS. I don't ask you whether it is comparable or not, but I am asking you the question.

The CHAIRMAN. He asks you whether you would sell out your paper mill.

Mr. BROOKS. I don't know that I care to have your comments made on my question, either.

The WITNESS. I don't know anything about it.

Q. You don't know whether you would? A. No, sir, I do not.

Q. Will you take with me pages 56, 57 and 58 of your schedule. You give us, I notice, on pages 56 and 57, the cost of a new plant. A. Yes, sir.

Q. Where are the details of that cost? A. I haven't any.

Q. Where have they gone to? A. Never made any.

Q. Never made any details. How could you tell the cost of the poles set without knowing the number of poles? A. When I said I never had, I meant substantially.

Q. You told me you hadn't had any. Now I am asking you another question. A. Yes.

Q. How did you get at the cost of poles set if you don't know the number of poles? A. I know the number of poles which are there now. I know that to cover the same ground would take substantially the same number of poles, and I use that as the basis of my figures.

Q. Then you had the detail, didn't you? A. In that extent, I had.

Q. Where is it? A. The details?

Q. Yes. A. I haven't them with me.

Q. Where are they? A. I don't know—destroyed them.

Q. Have they disappeared in smoke? A. I suppose so.

Q. Or have they floated away in the air? A. I suppose they are burned up by this time.

Q. Take your lamp brackets and your lamps and transformers. Where are the details for those? A. I didn't bring them with me.

Q. Where are they? A. I told you I destroyed them.

Q. And your wires and transformers and these various other things; you have destroyed your details? A. Yes, sir.

Q. Then your answer was wrong when you said you hadn't had any details, wasn't it? A. No. In part it was, and in general it was correct.

Q. You told me you had had no detail, never made any detail? A. I didn't make the finest details.

Q. I don't ask you whether the finest or the coarsest. A. I made some details. I didn't go into the thing entirely in detail.

Q. When did you destroy that detail? A. The same time I made the schedule.

Q. When did you make this last part of your schedule, pages 56 and 57? When was that completed? Within a week? A. Something over a month ago, I don't know but two months ago.

Q. A month or two ago? A. Yes, sir.

Q. How did you get at the value of your dynamo building? A. I got at that from general averages of buildings which we have built and were building about the time, 1898.

Q. The averages of buildings where? A. Some in Massachusetts, some outside of Massachusetts.

Q. Where in Massachusetts did you ever have a building that you looked to, to give you this valuation? A. I said I took general averages.

Q. Where in Massachusetts did you have any building that you had built, that helped to give you this summary, the valuation of the dynamo building? A. I have, in this and in other things—perhaps you don't care about that—general averages of the cost of construction.

Q. I don't ask you that. Whereabouts in Massachusetts was

there a building which you had in mind when you got up this result two months ago? A. You mean one of the buildings which made up that average?

Q. Yes. A. One in Haverhill.

Q. How many buildings did you take to get your average? A. I don't remember.

Q. About how many? A. I should say somewhere in the neighborhood of half a dozen.

Q. Scattered all over? A. Yes.

Q. Well, now, just give me the half dozen. Let us see about your average and about the cost of each one of the half dozen. A. I can't do that now.

Q. Where is your detail for that? A. I don't keep such details as that.

Q. Did you have it? A. I did have it, yes, sir.

Q. Now you say you got an average. You took a certain number of buildings, did you, and what you considered those buildings would cost, and divided by the number? A. No, I didn't.

Q. Well, pray tell me how you got an average. A. I got the average cost per square foot, of the cost of that kind of a building, and that is a thing that I used—ordinarily engineers use.

Q. Now you can't tell me any details of the elements that go to make up this dynamo building in Holyoke? A. This new one, you mean?

Q. Yes. A. I could if it was necessary; I didn't use that in the calculation.

Q. The amount of foundation, the amount of excavation, the amount of stone, brick and wood, and the various other elements that go to make up any of these plants. A. No, I couldn't give you that off-hand.

Q. And is the same true of the various other estimates that you have here? A. That is largely true.

Q. Well, it is entirely true, isn't it? A. No, sir, not entirely.

Q. With reference to the buildings? A. They form a very small part of all the items I have here.

Q. Well, is it true with reference to buildings—all buildings? A. Yes, sir, it is, in buildings.

Q. What plants do Stone & Webster operate in Massachu-

setts? A. I decline to answer that unless the Commission desire it.

The CHAIRMAN. I don't know. What is the use of that?

Mr. BROOKS. We purpose, may it please your Honors, to show that this gentleman and his employers are owning and operating plants today in Massachusetts, that are very far from the ideality that he sets up here.

Mr. MATTHEWS. What of it?

Mr. BROOKS. I say that it is entirely competent, showing that his practice contradicts his theories.

Mr. GREEN. I do not see how it can show anything about his practice.

Mr. MATTHEWS. Or Stone & Webster either. If counsel could point out the case of a new plant built by Stone & Webster, along in January, 1898, which resembled in any particular the plant of the Holyoke Water Power Company, that fact might have a relevancy; but the mere fact that they own different plants, plants of all ages, kinds and descriptions, cannot have any bearing in this case.

Mr. BROOKS. I offer, may it please your Honors, in this question, to show that this gentleman has valued and has operated, and is now employed by the owners, plants of a similar nature to the Holyoke plant, in Massachusetts. I purpose to follow it up by asking him what his valuation of those respective plants was, and then call your Honors' attention to whether or not he has been consistent in the practice such as he says is necessary in order to carry out his theories.

The CHAIRMAN. As contradicting his scheme of the ideal plant?

Mr. BROOKS. Certainly, contradicting his scheme of the ideal plant and his entire scheme of valuation—his valuation of the actual plant.

Mr. MATTHEWS. If it appeared that this witness had valued the structural features of another plant at about the same time in a different way, I should imagine that that might be competent. But if he or his employers, or he for them, had valued the stock of an electric light company, or the plant, business and franchises of an electric light company, such a valuation would have no bearing upon the validity of the theory to which he has testified

in this case, because he has not attempted to give a value to the stock, business and franchises.

Mr. BROOKS. I cannot put but one question at a time.

Mr. MATTHEWS. We have no serious objection—possibly the witness has—to making confidential disclosures. Our only objection is the probability that he has not valued the same thing.

Mr. BROOKS. I do not care what the probability is; I am going to ask him if I am allowed to. We will find out whether he has or not sometime.

Mr. MATTHEWS. And secondly, the practical objection that it might lead into an investigation of endless scope.

The CHAIRMAN. What his employer is doing is of no consequence to us. What he is doing may be.

Mr. BROOKS. If I do not connect it, of course I agree, may it please your Honors, that it will be of no consequence; but I cannot put several questions in one.

Mr. MATTHEWS. I understand the Chairman to say now that the Commission does not see how this witness can testify to what Stone & Webster have done; and that was your question, was it not?

Mr. BROOKS. I can only ask one question at a time.

The CHAIRMAN. We will not go into the dealings of Stone & Webster, anyway. We will go into the dealings that this man has, perhaps. We will consider that, Mr. Brooks, and let you know Wednesday.

Mr. GOULDING. May it please the Court, it appears to me that this evidence is competent on another ground entirely.

The CHAIRMAN. Well, we will hear you.

Mr. GOULDING. Here is a gentleman who has come on the stand and testified that it is necessary for proper economy, it is necessary under correct engineering principles, to abandon this plant, practically, put up a new one, remodel it, bring it into conformity with modern plants, he says. Now I think we have a right to show that Stone & Webster, whom he represents in business, are operating, if it is true, ten plants in Massachusetts that have no resemblance—remodelled plants, as a matter of fact, within his own knowledge and under the ownership of his own employers, plants of an entirely different character, are in operation, as bearing on the question whether proper engineering re-

quires the remodelling of plants. It may not be decisive of any question, and almost all evidence considered in its separate parts is not decisive of the whole question; the only question is as to its competency. And in that view I submit that it is competent.

The CHAIRMAN. Well, gentlemen, we will consider this and let you know on Wednesday what we think about it.

Mr. MATTHEWS. If your Honors allow this line of questioning, I assume that we shall be permitted full opportunity to go into the plants which may be mentioned.

Mr. BROOKS. What do you mean, go into them physically?

Mr. MATTHEWS. In evidence.

Mr. BROOKS. Oh, well, that may be.

The CHAIRMAN. That is introducing a collateral question.

Mr. MATTHEWS. That is the main objection to it.

The CHAIRMAN. Still, there is just this much to be said about it: here is a man who says, "Here, you ought to do so and so about the plant, put in so much money and take out so many machines." And on cross-examination he is asked, "Is that thing practiced? Have you followed that rule in your own companies?" He says, "No, I have not."

Mr. GREEN. That question is not, What have you done? It is, What has somebody else done?

The CHAIRMAN. Mr. Goulding thinks that undoubtedly the knowledge that this man has of what people like his employers have done is competent. I think we have the idea. We will think it over.

Mr. GREEN. That is on a different basis, however.

Mr. MATTHEWS. The point I desired to press was this, that if your Honors let in this testimony, it must be open to us to show that in the particular cases named there may have been some special reason why the practice recommended by the witness as applicable to Holyoke was not followed. In other words, an investigation of each case must be open to us.

Mr. GOULDING. We will jump the stile when we get to it and endeavor to deal with the evidence when it is offered.

(Adjourned to Wednesday, Dec. 26, 1900, at 10 A.M.)

FIFTY-THIRD HEARING.

BOSTON, Wednesday, Dec. 26, 1900.

The Commission met at the Court House at 10 A.M.

WILLIAM H. BLOOD, JR., *resumed.*

Cross-examination by Mr. BROOKS, continued.

The CHAIRMAN. Gentlemen, we have concluded to admit the evidence that was offered just before adjournment.

Mr. GOULDING. What was it?

The CHAIRMAN. Something about the knowledge of this witness with reference to electric plants in Massachusetts of a certain type. To our mind it does not make any difference who owned those properties: any familiarity of the witness with electric companies in Massachusetts you can inquire into. That is a matter of comparison, as I remember it, as to whether your plant at Holyoke is not the same system followed in other companies throughout the State.

Mr. GREEN. I understand the question you asked that was objected to is on page 1783, Mr. Brooks?

Mr. BROOKS. Yes.

Mr. GREEN. "What plants do Stone & Webster operate in Massachusetts?"

The CHAIRMAN. It does not make any difference what they operate, but what this witness knows about the operation of the —

Mr. BROOKS. Of course, in itself it amounts to nothing, except as I follow it by showing his knowledge. Of course, I assumed that that in itself would be perhaps of small consequence.

The CHAIRMAN. It is the knowledge of this witness that we care for, not what plants they operate. Perhaps you can modify your question, and ask him with reference to his knowledge of plants, whether operated by him or anybody else.

Q. What plants in Massachusetts have you had to do with the operation of? A. Something to do with the operation of the electric light plant at Lowell, and something to do with the operation of the plant at Brockton.

Q. Are those all? A. All I recall at the present time.

Q. What have you had to do with the operation of the plant at Brockton? A. Some things in connection with the contemplated change in the plant, the remodelling of it.

Q. What have you had to do with the operation of the Brockton plant? A. In the operation in the true sense of the word, my connection has been more in the engineering office capacity.

Q. Well, have you had anything to do with the operation of the Brockton plant? A. I have.

Q. Tell me what. What have you had to do with the operation of that plant, if anything? A. I have had some things in the way of questions of the maintenance of the lines, the maintenance of the lamps, the repairs on the lamps.

Q. What do you mean by that, given advice? A. Yes, sir.

Q. Personally, you have had nothing to do, have you, with the operation of that plant? A. I say I have, sir.

Q. In the way that you have told? A. Yes, sir.

Q. What did you do? A. I acted in the capacity of an electrical engineer in giving advice and in examining the defects which might exist, and in making recommendations as to changes which would improve and better the system.

Q. What, if anything, have you had to do with the operation of the Lowell plant? A. I have acted in a similar capacity in connection with the Lowell plant, only possibly to a larger extent than in Brockton.

Q. That is, you have given advice? A. Yes, sir.

Q. Who owns the Brockton and the Lowell plants? A. I think that Stone & Webster control them.

Q. Both of them? A. I think so.

Q. And your compensation came from Stone & Webster? A. Yes.

Q. How many electrical plants do they own in Massachu-

setts with which you have had any connection, directly or indirectly, in an advisory capacity or otherwise? A. You mean electric plants entirely?

Q. Well, you can put it that way. A. I think those two, as I state, are the only two.

Q. What electrical plants do they own with which you have had direct or indirect connection in an advisory capacity or any other capacity? A. They are interested, — I do not know to how great an extent —

Q. I did not ask you anything about — Well, that is all right. A. All right: then I cannot answer the question.

The CHAIRMAN. You do not mean to say they own the Lowell plant; for I happen to have some stock myself, as an executor, which does not belong to your people.

Mr. BROOKS. He said they had a controlling interest.

The CHAIRMAN. Oh, a controlling interest in the stock?

Mr. GOULDING. They don't own the Chairman.

The CHAIRMAN. I do not own any myself. It is very good stock, too.

The WITNESS. Thank you.

Q. In what plants are Stone & Webster interested in Massachusetts with which you have had any connection, directly or indirectly, advisably or otherwise? A. Besides the two that I have named, they are also interested in the Blue Hill Street Railway and the Plymouth & Brockton Street Railway.

Q. Did you examine those plants for them? A. Which plants, please?

Q. The two last plants. A. I have not. No, sir.

Mr. GREEN. What is the other besides the Blue Hill Street Railway?

The WITNESS. The Plymouth & Brockton.

Q. The Lowell plant and the Brockton plant did you place a valuation upon? A. I did not, sir.

Q. In whole or in part? A. I did not, sir.

Q. And did you make recommendations to Stone & Webster with reference to them? A. I have.

Q. You retained your residence still, when you had any connection with those plants, here, did you not, or wherever it was you said you resided?

The CHAIRMAN. Wellesley.

A. Yes, sir. I have not changed my residence.

Q. That is, you did not live at Lowell or Brockton? A. I did not,—no, sir.

Q. How much of the time were you there, at either of those plants? A. I don't know.

Q. About how much? How many hours or days in all did you spend at either of those places? A. I should think altogether the time that I had put in in Lowell in connection with this work might amount to in the neighborhood of a couple of months, various times.

Q. In Lowell? A. Yes, sir.

Q. And Brockton? A. Oh, about a month, perhaps.

Q. Was that before the purchase of their controlling interest that you looked over these plants? A. I think after. I am not certain about the date of that, though.

Q. Whom did you report to? A. Stone & Webster.

Q. What other electrical plants have you ever made any examination of and a report based upon your examination to Stone & Webster? A. I should rather not answer that question. A part of it is confidential to the business.

(The last question was read by the stenographer.)

The WITNESS. If I may add, some plants that I have reported on have not been acted on as yet, and it would be—

The CHAIRMAN. I think you ought to eliminate those at least until they become public knowledge. We ought not to go into these that he has not reported on. There is no occasion to, is there, Mr. Brooks?

Mr. BROOKS. Well, it struck us, may it please your Honors, that there was. Of course, we will take your Honors' ruling. I do not understand that there is any secrecy about it. I have in my hand a pamphlet—

The CHAIRMAN. I don't know anything about it. He says there are some that are still in the air, that he has not made any report on. If you can eliminate those without disturbing yourself, it will be just as well for us, I think.

Q. Does not your concern issue bulletins and advertisements, telling what they have done and what plants they have examined? A. I think they have done that at times.

The CHAIRMAN. If this witness hasn't any relation to those, you may inquire with reference to them so far as he has had any personal relations. That is the rule you are following, as I understand it.

Mr. BROOKS. He says it is private business, and I am asking if Stone & Webster, his own employers, did not advertise the plants they had examined.

Mr. MATTHEWS. They would not advertise plants they were examining which had not been made public. The probability is that the ones advertised are the ones that have been made public.

The CHAIRMAN. So far as the bulletin goes, I do not see why you cannot examine the witness if you desire to.

Mr. MATTHEWS. We do not object to anything contained in the pamphlet issued by Stone & Webster.

The CHAIRMAN. Keep yourself to the pamphlet, Mr. Witness.

Q. Will you answer that question?

The CHAIRMAN. Put the question, Mr. Brooks, so he can get it.

Mr. BROOKS. I thought he had it in mind. I will ask this question,—

Q. What plants have you examined and reported on to Stone & Webster up to July 1 of the present year?

Mr. GREEN. If that involves reports that have not been acted upon, which is business still in abeyance, I think the witness should be excused from that.

The CHAIRMAN. What do you say to that, Mr. Brooks?

Mr. BROOKS. I do not agree with my friends upon the other side, may it please your Honor. It might be questionable; and we might desire to be heard on it later, as to whether I have any right to go into any report that he had made or any valuation that he had formed on plants, his report not having been acted on.

The CHAIRMAN. Well, I suggest that you keep yourself to that which has been reported on now, and then go into the other afterward. Now, Mr. Witness, confine yourself to those that have been publicly acted upon. Now what do you say to those?

The WITNESS. Will you read the question again, please?
(The last question was read by the stenographer.)

The CHAIRMAN. And I have suggested as an amendment "that have been publicly spoken of."

Mr. BROOKS. And I will amend it in this way, may it please your Honors,— "which report has been acted upon."

The CHAIRMAN. Yes. Haven't you these things familiar in your mind?

The WITNESS. No, sir. I cannot, with that kind of a question, answer it off-hand. I do not know what he means by "which report has been acted upon." Sometimes their reports are acted upon immediately, and sometimes they are acted upon and the man making the report don't know anything about how far they are acted upon.

The CHAIRMAN. All right, go ahead.

The WITNESS. I cannot answer that question.

Mr. BROOKS. Then I will put the other question.

Q. What plants have you examined and reported on to your firm up to July first of the present year?

Mr. GREEN. I suppose that is the same question that we have been discussing.

The WITNESS. I can answer that in part.

The CHAIRMAN. Go ahead.

A. The plant at Tampa, Fla., one at Savannah, Ga., the plant at Lowell, Mass., and Brockton, Mass.

Q. What others? A. I think that is all I care to make public at present.

Q. Well, I am going to insist on my question. If you say that you refuse to answer, or to give any others— A. I think the Chairman has told me to answer such ones as have become either public property or reported on so that the public knew about them, and with that in mind that is the answer I give.

hT e CHAIRMAN. What is the purpose of this question, Mr. Brooks? To test his capacity as an expert?

Mr. BROOKS. That is one; and then I purpose to consider with him, perhaps, the question of structural values.

Mr. MATTHEWS. The difficulty, I take it, may be shown

by an illustration. Suppose that Stone & Webster, who, it appears, are largely engaged in the business of buying and selling electric plants, had been asked to value a plant in some place, and this witness had been delegated by them to make an appraisal of it; that he had reported to his employers, but that the negotiations for the sale were still pending, and nobody knew anything about it and nobody was supposed to know anything about it. I take it, it is cases like that that this witness does not care to disclose. But, wherever the matter in which a report has been made by him had gone through the negotiations to the point of completion or abandonment, I assume from his answer he is perfectly willing to state the facts. It seems to me he ought to be protected by the Court. It is not our objection, you understand. The City of Holyoke does not care anything about it one way or the other.

The CHAIRMAN. The Commissioners think, Mr. Brooks, you ought to be limited to those that are made public.

Mr. BROOKS. Very well.

Q. Did you place the valuation upon or have anything to do with an examination of the Milford plant? A. You have asked me two questions. Which one do you want answered?

Q. Answer the question that I have put.

Mr. GOULDING. Both of them, if you please.

The CHAIRMAN. I didn't hear the question.

(The question was read by the stenographer.)

Mr. GOULDING. The witness is criticising the question as containing two questions. His business is to answer the questions, and not to criticise them.

Mr. MATTHEWS. The witness is asked for a categorical answer to two questions.

Mr. GOULDING. He was asked if he had anything to do with it or had valued it.

(The question was again read by the stenographer.)

A. No, sir, I did not.

Q. Who did? A. I don't know.

Q. Connected with your concern? A. I don't know.

Q. Was there a valuation made of that plant by your concern?

Mr. GREEN. I object.

A. I don't know.

The CHAIRMAN. I don't see how that is competent.

Q. Did you have anything to do with that Milford plant?

A. I did not.

Q. Directly or indirectly? A. I did not.

Q. Then why did you say that there were two questions that you could not answer? A. Did I say so?

Q. In substance that, didn't you? A. I asked which one you wanted answered, sir, as I remember.

Q. Well, if you didn't have anything to do with it, and you had made no examination of it, it was a question that you could answer by yes or no, especially no, very readily, couldn't you?

A. Yes, sir.

Q. What electric lighting plants in Massachusetts have you ever structurally valued? A. None.

Q. What plants have you ever placed a valuation upon, electric lighting plants, in the State of Massachusetts, if any?

A. I don't know of any just now.

Q. On page 14 of your schedule you estimate, do you not, on the basis of about 900 horse-power capacity for the new or ideal plant? A. Yes, sir, in that neighborhood.

Q. That is the engine power that you estimate for your new or ideal plant? A. In that neighborhood, yes.

Q. That would be 14 mill power substantially, wouldn't it? A. Yes, about that.

Q. About 14, yes. Now on that same page you allow \$10,000, do you, for earnings during the construction of the new plant? A. I have considered it.

Q. Well, is there any place in which you allow that? A. Only that one paragraph there, on that page.

Q. That is next to the last paragraph? A. Yes, sir.

Q. Yes. Did you make any estimate as to how long it would take to establish a business and obtain subscribers?

A. I did,—yes, sir.

Q. Where does that estimate appear in your schedule?

A. Oh, in my schedule? No, not in my schedule.

Q. Well, where is your estimate? A. In my mind.

Q. Oh. Take, for instance, the Holyoke plant: how long did you estimate it would take a new plant starting in new to establish a business equal to that of the Holyoke plant? A. I think it could be done in six months easily.

Q. Did you ever hear of a case, or do you know of a case, where any such accomplishment as that has been had? A. Yes, I do.

Q. Where in Massachusetts? A. I don't know about Massachusetts.

Q. Or New England? A. I don't know about New England. I didn't have New England in my mind.

Q. Where, anywhere, have you discovered a plant that has been newly established that has obtained a business within six months which netted them \$23,000 in profit? A. I don't know that I know of any plant that has done just that exactly.

Q. You mean that the six months is after the work is completed, do you? A. I did not consider it that way.

Q. How did you consider it? A. You would naturally start in to canvass the town before the plant was completed. It would probably be—I should say you would begin three months before the plant was completed, and it would probably lap over three months after the plant was completed.

Q. That would be substantially nine months? A. No, I should think three and three made six.

Q. You said— A. Three months before it was completed, and carried on three months after.

Q. Do you know what the earnings per capita are in Holyoke of this plant? A. I don't remember now.

Q. Have you ever known? A. I have,—yes.

Q. Well, I will run back again to the question: you say that in your opinion, as I understand you, the results could be obtained by a new plant in the city of Holyoke within six months that have been attained by the Holyoke Water Power Company in its present plant? A. I should think so,—yes.

Q. On what do you base that judgment? On what experience of yours do you base that judgment? A. I base it partly on the testimony which has gone into the case already—

Q. I ask you, on what experience of yours you base that

judgment? A. I beg pardon: I didn't hear the word "experience."

Q. Yes, sir. A. On my general experience in electrical matters.

Q. Have you ever known of an instance where such a result as that at Holyoke has been obtained in the time you state?

A. Proportionately greater, yes.

Q. What? A. Proportionate to the size of the town, greater results have been obtained.

Q. What size do you have in mind now? A. Oh, towns running from five to ten or fifteen thousand inhabitants.

Q. You understand the population of Holyoke is 45,000 people or more? A. Somewhere in that neighborhood, I understand.

Q. Between 45,000 and 50,000 people? A. Somewhere in that neighborhood.

Q. What town did you have in mind as having obtained these results within a period of six months from the commencement of the plant, — commencement of the construction of the plant? A. I had in mind a number of those Western towns which I gave in the early part of my testimony, about all of which did.

Q. Did those towns that you have in mind have gas plants running previously to the electric plants? A. I don't remember now any one that did.

Q. Do you know of any town where there was a gas plant established and doing business, and doing business successfully, where an electric plant has been established and accomplished the results that you say can be done within six months?

A. That means considerable thinking over of the matter. I do not off-hand remember anything of that kind.

Q. Mr. Blood, have you ever been a steam engineer at any plant, electrical or otherwise, doing a commercial business?

A. You mean running steam engines?

Q. Yes.

Mr. GREEN. (To the stenographer.) Will you read that question?

(The question was read by the stenographer.)

A. Not to any extent.

Q. Well, have you at all? A. I have,— yes.

Q. What do you mean by “not to any extent”? A. I mean that in a number of plants that I have contracted for and installed that I have been there, and started up the engines and looked after the running of them while they were first put in.

Q. For how long? A. As I said, only when they were first put in, just for —

Q. For an hour? A. For a few hours, perhaps.

Q. Yes. You say plants which you have contracted for? A. Yes, sir.

Q. As purchaser or in behalf of purchasers? A. No, sir, as a contractor.

Q. Yes. What plants in New England have you ever contracted to build, and which you did build? A. None, sir.

Q. In how many plants operating mills or electric stations have you personally conducted tests and determined the steam power cost per horse power per year? A. To answer that question —

Q. If any? A. It would be impossible for me to do it alone on any.

Q. In how many plants operating mills or electric stations have you ever personally conducted a test to determine the steam-power cost per horse power per annum? A. I guess I had better answer that none.

Q. Do I understand you to claim that you consider yourself a steam engineer? A. Not to any great extent.

Q. You allow, do you, on page 18, for repairs upon steam plant running 24 hours per day about 2 per cent.? A. No, sir, I do not.

Q. Is not that what it amounts to? A. No, sir.

Q. What per cent. do you allow for repairs? A. I allow 2 per cent. on the entire plant, not on the steam plant, as I understood the question.

Q. That is, you allow 2 per cent. upon the entire plant? A. Approximately.

Q. Steam and electric? A. Approximately that,— yes, sir.

Q. You use the same percentage, then, for your electrical plant for repairs? A. No, sir, 2 per cent. on the entire plant.

Q. How much on the steam plant? A. I have not separated it, sir.

Q. Can you tell me how much you would allow in percentage upon the cost of your steam plant for repairs? A. No, sir, I do not figure it that way.

Q. And you do not know? A. Not exactly,—no, sir—the percentage.

Q. You allow for lubricants and waste, on page 18, \$300 on a plant that runs 24 hours a day, 365 days in the year, and 900 horse power capacity, do you not? A. Yes, sir, lubricants and waste.

Q. On what did you base that allowance? A. I based it on general averages of plants of a similar size running under similar conditions.

Q. From your personal knowledge? A. From my personal knowledge,—yes, sir.

Q. What plants did you have in mind of a similar size running the same length of time, 24 hours a day, 365 days in the year, which was the basis of the judgment expressed here, \$300 for lubricants and waste? A. A number of plants which I have operated from our office.

Q. I am asking you for your personal knowledge—what plants, to your personal knowledge, of this capacity, running this same length of time, only expend for the year \$300 for lubricants and waste?

The WITNESS. Perhaps I had better have the question read: I did not understand it fully.

(Question read.)

The WITNESS. Mr. Chairman, I am in rather a peculiar position to know how far my personal knowledge goes, separated from the records which we have in our office showing the actual conditions which are existing in plants which are operated by our office.

The CHAIRMAN. Well, if you testify as an expert and you depend on that data in your office, you can say so.

The WITNESS. To a large extent I do.

The CHAIRMAN. Then come to the question: he wants to know what plants of this similar character you know about from the records made in your office or anywhere else that you happen to know about.

Mr. GOULDING. We asked about his personal experience.

Mr. BROOKS. Yes, I was inquiring of his personal knowledge.

The CHAIRMAN. Then they are limiting you to your personal experience,—what you know yourself, not what you get out of the office or anywhere else.

The WITNESS. It is pretty hard to separate the two.

Mr. BROOKS. If you can say you do not know, I will pass along.

The WITNESS. The only one that I know absolutely of, in my own personal experience, is a plant down at Tampa, Fla.

Q. Did you make the test to determine? A. There was no test made to get figures of that kind.

Q. Was the plant at Tampa the size of this plant? A. Approximately.

Q. Did it produce what this plant produces, and did it run the same number of days and the same length of time? A. It runs all the time.

Q. What did it produce? What was its load? A. Approximately comparable to this.

Q. What does that mean? You mean approximately the same? A. Yes.

Q. That is, it produced the same product substantially that this produces in amount? A. No, the general output would be about the same; something in the neighborhood of 200 horse power average.

Q. What was the capacity of the engines,—boilers? A. One of about 700 or 800 horse power and the other about 150.

Q. How did you determine what it cost for lubricants and waste for a year at Tampa? A. From the bills of what we paid for oil and waste for the time that I was there—

Q. Were you there a year? A. —amounting to a couple of months or so, and also looking over the bills for the lubricants and waste for the time that went before that.

Q. For how long? A. For the time that went before that enough to make up a year.

Q. You made a personal inspection of the bills to determine, did you? A. I did,—yes, sir.

Q. What other plant do you use in your mind in forming this estimate of the cost of lubricants and waste? A. I have used the one at Brockton.

Q. What? A. This one at Brockton.

Q. What others? Is that one at Brockton of the size of the one at Holyoke? A. No, it is not. I have taken that into consideration, though.

Q. Running back for a moment, is the engine that you speak of at Tampa the same kind of an engine that you would have for your ideal plant? A. Is it?

Q. Yes. A. No.

Q. What steam plant do you know of such as you would install in your ideal electric plant of the size of the one specified by you in your schedule that only uses \$300 worth of lubricants and waste running the same length of time? A. I do not know of any.

Q. In no part of your schedule do you in your mind or upon paper compound the present steam plant of the Holyoke Water Power Company situated at its electric station, for purposes of comparison? A. Do you mean make the engines run compounded?

Q. Yes. A. I do not think I have, sir.

Q. Have you made any estimate along that line by compounding the present engines? A. I did,—yes, sir.

Q. Where is that estimate? A. I destroyed it.

Q. How soon after you had made the estimate did you destroy it? A. As soon as I talked with a mechanical engineer, a steam engineer, a builder of steam engines, I destroyed it.

Q. How many other estimates than appear here in your schedule have you made and destroyed? A. I could not begin to tell you.

Q. In connection with this case? A. I could not tell you.

Q. Well, their name is legion? A. I do not really know what you mean, what you call an estimate. I have made a

good many figures and a good many sub-estimates and partial estimates; and I have destroyed those, in connection with this work.

Q. How many different valuation estimates have you made that you have destroyed? A. I do not know of any that I have made that I have destroyed.

Q. Have you made any than those that appear here in this schedule? A. I do not think any completed ones,—no.

Q. Did you make any partial ones? A. Yes.

Q. And those are destroyed? A. Yes.

Q. I see you have on page 19 of your schedule an item, "Distribution labor, 9 months, \$6,228 per year"? A. Nine months, \$4,672, makes \$6,228 per year.

Q. Well, the \$6,228 is for the year? A. Yes, sir.

Q. Where are the details of that estimate? A. I took that from —

Q. Where are the details?

Mr. GREEN. Let him explain.

Mr. BROOKS. Well, I am going to. He can tell me where the details are. A. I do not know.

Q. Were they destroyed? A. I do not know.

Q. Did you make the estimate? A. I did not.

Q. From whom did you take it? A. I took it from the testimony already in on the cost from one of the witnesses on your side.

Q. From whom? A. I do not remember who it was now. I could find it.

Q. You worked out no detail yourself? A. No, sir.

Q. Has any of the detail which led to the results specified in your schedule survived?

The WITNESS. I haven't an idea what that question means. (To the stenographer.) Will you read it again, please? (Question read.)

A. I cannot answer that question.

Q. You have an item on page 19, "Labor on repairs, \$600"? A. Yes, sir.

Q. Is there any corresponding item on page 18, cost of operating the ideal plant? A. Not exactly,—no, sir.

Q. There isn't any corresponding item, is there? A. Not exactly.

Q. I see no such item on page 18, "Labor on repairs"; and there is no such item, is there? A. Not specifically,—no, sir.

Q. Well, is there generally—"Labor on repairs"? A. Not in so many words,—no, sir.

Q. On page 18? A. Not in so many words.

Q. Do you mean by that that you have included it in some other item on page 18 for your ideal plant? A. No, sir, not exactly that, either.

Q. On page 19 you have "Repairs, \$3,700," on the cost of operation of the old plant entirely by steam, have you not? A. Yes, sir.

Q. Where is the detail of that? A. I have none. I do not know where it is.

Q. What test have you ever personally made to determine the loss in shafting and belting? A. I have made several tests.

Q. Where? A. One of the most complete ones was at the plant at Tampa, Fla.

Q. What other test have you ever made? A. I have made one in Cambridge, Mass.

Q. What kind of a plant? A. It was a manufacturing plant.

Q. Where? A. I do not remember the street now: it was in Cambridgeport.

Q. What was the name of the establishment? A. It was a plumbers' supply factory.

Q. And did you determine there by that test that the loss in shafting and belting varied from 5 to 30 per cent.? A. That last one I speak of?

Q. Yes. A. No, sir, I did not.

Q. Where did you make any test that led you to the conclusion that there was a loss in shafting and belting varying from 5 to 30 per cent.? A. The one at Tampa I spoke of.

Q. Did that show that variable loss of from 5 to 30 per cent.? A. I do not mean it that way at all.

Q. Well, on page 24, that is what you state, isn't it,—that

the loss in shafting and belting varies from 5 to 30 per cent.?

A. What page is that, please?

Q. Page 24. A. If you will read the rest of the sentence, it explains itself, I think: "Under varying conditions."

Q. Well, did you ever make a test that showed you a variance in loss in shafting and belting from 5 to 30 per cent.?

A. It does not all come from my own personal experience.

Q. I am asking now for your own personal experience. Where did you have any personal experience showing such a variation in loss as from 5 to 30 per cent. in shafting and belting? A. Do you mean variation in one particular installation or from one installation to another?

Q. I am asking you now where you had any experience that showed a loss of from 5 to 30 per cent. in shafting and belting, if anywhere? A. Why, those two cases that I named showed the loss that I named — in that neighborhood.

Q. Oh, 5 to 30 per cent.? A. Yes, sir.

Q. The one in Cambridge showed a loss of 5 to 30 per cent. in shafting and belting, and also the one in Tampa? A. I didn't say anything of the kind, sir, not intentionally.

Mr. GOULDING. The question was asked you — intended to be a question. I do not know why you should not answer it.

Mr. GREEN. I submit that the witness has answered the question. He explained awhile ago that there was some difficulty in understanding it. He suggested to our friends that there was some difficulty in the application of the question.

Q. Is there any plant that you know of from your own personal experience that shows any such loss as that? A. Which do you mean, sir, — 5 — ?

Q. From 5 to 30 per cent.? A. Yes, sir.

Q. Where? A. I said that one at Tampa.

Q. Well, that is what I asked you. That showed a loss, did it, in shafting and belting that varied from 5 to 30 per cent.? A. No, sir, it did not.

Q. You say that you do not come to this conclusion from your personal experience? A. Partially, I say.

Q. From what other data do you come to any such conclu-

sion? A. From books and periodicals that I have read in regard to this friction loss in belting and shafting, and also in conversation with steam and mill and hydraulic engineers conversant in the matter.

Q. Have you any book or periodical in mind that makes the assertion that there is a variation in loss in shafting and belting of from 5 to 30 per cent.? A. No, sir, I have not.

Q. Now, running along to pages 56, 57, and 58 of your schedule, which is the cost, as I understand it, of a new or ideal plant? A. Yes, sir.

Q. Where are the details that go to make up these costs? A. I testified the other day that I made no detail.

Q. I think you did. We were uncertain about it. A. That is, I qualified it by saying in general I made no details. In certain cases I did.

Q. Did you make any details? A. I did, some.

The CHAIRMAN. I think he made some qualification the other day.

Mr. BROOKS. Perhaps he did; but I must say that I have forgotten, your Honor, and we were in doubt about it.

The CHAIRMAN. I may have dreamt it.

Q. I will take up each page here. Where are the details for the amounts stated on page 56? A. I think I had said at the time that I destroyed all my detail calculations.

Q. Did you ever have any details for that page 56? A. To a certain extent I did,—yes.

Q. On what? A. Why, I knew the number of dynamos, the number of engines, and knew the cost of each. I knew the size of the building and the cost per square foot.

The CHAIRMAN. You went into all this the other day, Mr. Brooks, as Mr. Cotter and myself remember it.

Mr. BROOKS. I do not so recall.

The CHAIRMAN. Didn't you, Mr. Witness?

The WITNESS. Yes, sir, I did. I remember going into it some.

Q. Take page 57: did you have any details for that? A. I had some,—yes, sir.

Q. Well, I think perhaps I asked you the other day—I

want to ask it again if I am permitted — how many lamps and transformers do you have? A. At the time I figured this I used approximately the same number as now employed.

Q. How many and what kind of transformers for your new or ideal plant? A. As near as I can answer that question, I say approximately the same number as now employed and the same capacity.

Q. What kind? A. I do not care what kind — did not care what kind, I mean, when I made the —

Q. What kind did you have in mind when you estimated? A. No particular kind. An average kind might answer it better.

Q. You have an item, "Lamps and transformers"? A. Yes, sir.

Q. That is, the transformers for running the arc lamps that you had in mind in your \$13,000 item? A. No, sir, I think that is not in that item.

Q. But look further down: you have got an item of \$1,200 for other transformers? A. Yes, sir, I think so.

Q. Is not that the transformer you meant here under the item "Lamps and transformers," the transformers for your arc lamps? A. Which one do you mean?

Q. The third item? A. No, sir, I think those transformers in the third item are the transformers simply for use in connection with the —

Q. Then the —

Mr. GREEN. Just let him finish.

A. Yes, you are correct. The lamps and transformers were the arc lamps and transformers.

Q. Those constant current transformers? A. Yes, sir.

Q. Can you give me any details for any of these three pages that you now have in mind, that you used when you came to conclude on these estimates? A. I have destroyed all that detail. I could easily work it out again if necessary.

Q. What page is your depreciation on? A. Page 46, I think.

Q. Is that contained in the sheet that was submitted the other day — on Saturday? A. I did not —

Mr. GREEN. I can tell you what that was. That was the depreciation on the parts that are to be retained in use.

Q. Where are the details of that depreciation? A. The details that go to make up that —

Q. Have you any details that go to make up these various — A. It is simply a matter of subtraction. I have not it on paper.

Q. For instance, the buildings. Have you any details for that depreciation? A. That comes, if you want to know that question, that amount — that comes from page 6.

Q. But that, turning to page 6, you have no details of, have you? A. Yes, the detail on page 6 comes from page 12.

Q. But you have not any details on page 12, have you? A. I call those details.

Q. Well, "Dynamo building": I will take, for instance, the depreciation on the dynamo building: where are the details of that depreciation? A. I have explained how I got those details, or as much detail as I have — that statement right before those two words, "Dynamo building."

Q. Have you any details, or did you have any details, that went to make up that \$9,500? A. Only so far as I have answered the question: that is the only detail.

Mr. GREEN. What do you mean by "Schedule D, page 1"?

Q. I may be obtuse about it, but what went to make up that \$9,500? What are the details of that lump sum? A. The only details that I worked on that were the cost to reproduce new, item by item. The details of that have been submitted, then these have been worked out from them.

Q. But how does that show depreciation? A. That is shown by that statement of mine on page 12.

Q. How do you arrive—what I am after is, how you arrive at these various sums for depreciation that you have stated throughout your schedule in one place and another? A. I arrive at them directly by considering the condition that it is in, the age of it, and the—what I know from general experience as to the way property of this kind does depreciate and become of less use.

Q. How long were you in determining what the depreciation of the dynamo building was? A. I don't know.

Q. What? A. I don't know.

Q. When did you determine it? A. Something like a year ago, I think, as I stated.

Q. How long after your examination? A. I don't know.

Q. Well, about how long, months or weeks or days? A. It might have been a couple of weeks or a month, I don't know just exactly.

Q. You were down there for two or three hours? A. Longer than that, I think.

Q. Half a day? A. Yes.

Q. In the examination, as you claim, of everything there was there? A. Yes, sir.

Q. Outside and inside? A. Yes, sir.

Q. Now, tell us what the condition of that dynamo building is, what the defects in it are in the way of depreciation that reaches this sum of \$9,500? A. In the first place, the building as a building is what they call "mill construction," which is not adapted to electric lighting purposes. It is not a fireproof building; it has a second story on it, which has more or less objectionable matter, matter which would be very likely to be the cause of fire; the floors of the building are saturated with oil, and in case fire started it would burn down quite rapidly.

Q. Yes. A. The building is largely made out of brick, which gradually depreciates in time, which you cannot see from outside appearances sometimes, but we know as a matter of fact that they don't live forever.

Q. Well, what else? A. Those are some of the principal items.

Q. Can you tell me how much you allowed for any particular item? A. That went to make up the building, you mean?

Q. Yes. A. I didn't do it that way, sir.

Q. Then you reached it by comparing it with such a structure as you would consider new or modern or ideal? A. Partially that way, yes, sir, as I said.

Q. And entirely that way? A. No, sir, not entirely.

Q. In getting at your \$9,500? A. Not altogether, no, sir, if I remember rightly.

Q. Well, take, for instance, the steam engine building. Did you reach that by comparison with the cost of a new and more modern or ideal structure? A. Partially.

Q. Well, in these various buildings how much of this amount of depreciation was arrived at by comparison with a new or ideal or modern structure? A. I depreciated these buildings on account of age and condition only in the first place; then from that figure I considered their adaptability and suitability for the work which was required of them.

Q. Yes. A. And that figure, for instance, \$3,750 on the steam engine building, was arrived at by considering those two items.

Q. Those three, you mean? A. Three, I mean.

Q. Well, now, how much did you depreciate for age? A. I didn't separate the age from the condition.

Q. How much for condition? A. I said I didn't separate age and condition.

Q. You did not separate the results attained by you by comparison with a new or modern or ideal structure? A. Not in that first depreciation, no, sir.

Q. Now, take the engine room and the boiler house. What depreciation did you see? A. The depreciation for condition or adaptability I could see very readily.

Q. Well, isn't it substantially the same as you would have as a part of your modern plant? A. Partially so.

Q. Isn't it substantially so? A. You refer now to what two buildings, please?

Q. Steam and boiler house. A. Steam and boiler house? Only partially so.

Q. I meant steam engine and boiler house; I guess you understood me. A. Yes.

Q. Now, I think this last sheet that was put in was called "schedule H"? Wasn't it? A. Yes.

Q. Which was put in on Saturday. How long a time did you spend in the inspection of the dynamo building? A. I cannot divide up the time.

Q. Well, approximately? A. I don't know.

Q. How long a time did you spend in the inspection of any of the buildings or mechanisms or items that are contained in this

schedule H, approximately? A. Why, altogether an afternoon. I cannot divide how much I spent on any one part or how much I spent on any other part.

Q. Well, how much of the time of this afternoon did you spend outside on the line? A. Not more than possibly an hour and a half; not over that, I should think.

Q. An hour and a half. How long in hours were you there at the station? A. I should think somewhere close to three hours perhaps in the station.

Q. Yes. Did you inspect the entire line? A. No, sir; I did not.

Q. You knew that there were about fifty miles of line there? A. I should imagine there was somewhere in that neighborhood of wire, not of line.

Q. Well, you understood there were fifty miles of streets there? A. No, sir; I don't understand it that way, if I remember it, not anywhere near fifty.

By the CHAIRMAN.

Q. About thirty, aren't there? A. I cannot say off-hand. I should not think there were thirty of pole line.

Q. All right; I thought you gave the number of feet of wire in this schedule somewhere. A. I do give the number of feet of wire, but that does not mean pole line.

By Mr. BROOKS.

Q. I think you told us that the poles were in bad condition? A. So far as—

Q. In some instances? A. Yes, sir; I told you so.

Q. Whereabouts did you see any poles that were in bad condition? A. Well, I saw quite a number on Main Street, that is, the main street, I don't know as that is the name of the street.

Q. How did you know, or how were you able to distinguish the poles belonging to the electric light company and the poles belonging to the telephone company? A. Just by looking at them.

Q. Could you distinguish? A. I think I could, yes.

Q. And did you determine which were which? A. I think I did, yes, sir.

Q. You know whether you did or not, don't you? A. I don't know now. I think I did, I say.

Q. Mr. Blood, do you know that it is a fact with the electric plants of Massachusetts that 60 per cent. of the gross income is expended in operating expenses? A. I think that is substantially correct, yes, sir.

Q. Did you know how large a per cent. of the gross income was expended by the Holyoke plant in operating expenses? A. No, I don't.

Q. Had you made any examination of the Gas and Electric Light Commissioners' report to determine that? A. I have looked it over, yes.

Q. Did you find that they were up to the average? A. I know that that is the statement there, yes, sir.

Q. Did that enter at all into your calculations? A. Not in valuing the plant.

Q. In valuing it? A. Not in valuing the plant, no, sir.

Q. As I understand it, you include in your depreciation present necessity for extensions? A. Well, present—

Q. Am I correct? A. I should not use that word, no.

Q. Of course you will not split hairs with me on the words. Do you include necessity for extensions in your element or item of depreciation? A. No, I didn't consider it just that way.

Q. Well, do you consider extensions depreciation, or the necessity for extensions depreciation? A. No, sir; I should not.

Q. Did you take extensions or the necessity for extensions into consideration? A. No. No, sir; I did not.

Q. Would you have depreciated it the same amount if there had been no necessity for extensions? A. I think I should, yes.

Q. What do you know with reference to the efficiency of the Schuyler and Edison dynamos and the General Electric alternators? A. I know that the Schuyler dynamos are not particularly efficient; I know that the Edisons are quite efficient, and the General Electric alternator is fairly efficient.

Q. What experience have you ever had with the Schuyler machine? A. Personally none.

Q. Did you ever measure the efficiency? A. On the Schuyler machine?

Q. Yes. A. I have not, no sir.

Q. Then you don't know what the efficiency is, do you? A. I do know, yes, sir.

Q. Well, what is it? A. I know, as I stated, that it is not efficient.

Q. How efficient is it? A. It depends somewhat on the load on it. When it is running at full load under the best conditions the efficiency might be—probably is—about 70 per cent. maximum.

Q. Have you ever tested to determine the efficiency? A. I have not, no, sir.

Q. Have you ever tested the General Electric alternator, to determine its efficiency? A. I have, yes, sir.

Q. And what is the efficiency of the General Electric alternator? A. I suppose you mean of this size that is in here?

Q. The same as the one contained in the present plant. Have you ever tested one of that size? A. I have, yes, sir.

Q. Where? A. At Lynn.

Q. When? A. I suppose it was in—about 1900, I think.

Q. This year? A. I didn't mean that. I meant 1890. That is what I meant to say.

Q. What is the efficiency that that test showed you, of the General Electric alternator? A. I don't refer to any one particular test, but a number of tests there. I think, as I remember it, the efficiency would be up somewhere in the neighborhood of 85 per cent.

Q. What would be the efficiency of the alternator that you intended to put in your remodelled or modern or ideal plant? A. It would run in the neighborhood of 95 per cent.

Q. You have an alternator for your remodelled plant, haven't you? A. I have, yes, sir.

Q. In the schedule? A. Yes, sir.

Q. What is the efficiency of that? A. That is what I was answering, in that question.

Q. Very likely you were. There seems to be some misunderstanding about it. A. I thought that was what you meant.

Q. That is the 100 kilowatt alternator? A. No, sir, it is 300 kilowatts, as I remember it.

Q. Your remodelled plant? A. Oh, I beg your pardon.

Q. What is the efficiency of that 100 kilowatt alternator that you have for your remodelled plant? A. That will probably be about 90 per cent. efficiency.

Q. Have you ever tested that? A. I have not, no, sir.

Q. Or ever seen any test of it? A. I have seen tests of machines of that size, yes.

Q. The same kind of a machine? A. Yes, sir.

Q. And you think that would be 85 or 90 per cent.? A. I think it would be about that, yes; nearer 90.

Q. That would be approximately the same as this General Electric alternator? A. In efficiency it would be a little better.

Q. When was this General Electric alternator built? Was it 1896? A. I don't know when it was built.

Q. Is it a common practice to have the power, in arc lighting and in incandescent lighting systems, separate, in Massachusetts? A. It is and it is not. I cannot answer that question.

Q. Well, is it common practice? A. There are a good many plants we get in that way, yes. I should not—

Q. Take cities of 50,000 people or more, is it common practice? A. In old plants it is. I cannot answer that—common practice.

Q. In Massachusetts? A. Common practice refers, does it not, to something that is going on right now?

Q. Yes; something that was going on in 1898. A. It wasn't common practice to put in plants that way in 1898.

Q. Did I ask you that question? A. I am trying to answer it.

Q. I ask you whether or not it is common practice to have power for arc lighting and incandescent lighting systems separate?

The CHAIRMAN. Or was in 1898.

Mr. BROOKS. When I say "is," I mean 1898.

A. I have answered it, your Honors. There were a great many plants in that way. It wasn't common practice to put plants in in that way, though.

Mr. BROOKS. I do not ask you that.

The CHAIRMAN. He asks you what was the common practice in the plants that were established January, 1898.

The WITNESS. If that is the question, then I think I have answered it. There were plants of that type in many of them.

Q. Were not a majority of them in in that way in 1898? A. I think they were, yes, sir.

Q. And wasn't it a large majority? A. I think it was, yes, sir.

Q. In 1898, in Massachusetts, did you know of a single plant in cities of 50,000 people or thereabouts that operated on a single system? A. Personally I did not, no.

Q. Will you turn to page 10 of your schedule for a moment, your first item of wire, \$7,000. You say the heavy wire would be of little use except for scrap? A. Yes, sir.

Q. How much of that wire did you figure scrap? A. I think that all the OOOO wire would be scrap.

Q. Well, how much? A. As I have it here, 742 pounds.

Mr. GREEN. What page have you there?

The WITNESS. 38.

Mr. GREEN. That is Schedule E, page 4.

The WITNESS. Yes. I see the stenographer put the decimal point in the wrong place all the way down.

Q. You don't mean 742 pounds, do you? A. Excuse me, no, I do not. I mean 6,000 feet. I haven't got it in pounds here. Excuse me, I have too. Yes, 4,452 pounds.

Q. And you valued that as scrap how much? A. As scrap, about 9 cents a pound.

Q. Did you consider that, as of 1898, a fair scrap value? A. I did, yes, sir.

Q. 9 cents? A. Yes, sir.

The CHAIRMAN. 10 and 38 are the pages, aren't they?

The WITNESS. Yes, sir.

Q. For your ideal or modern plant, as I understand it, you install constant-current transformers? A. I had that in mind, yes, sir.

Q. And alternating current arc lamps? A. I had that in mind, yes, sir.

Q. Do you know of any plants in the world that used those mechanisms in January, 1898? A. I do not.

Q. Do you know how long after January, 1898, they were first used? A. First used commercially, I suppose you mean?

Q. Oh, certainly. A. Yes, I think I know approximately.

Q. When was it? A. Early in the summer of 1898.

Q. Was there one sold of this class of transformers or of this class of arc lamps, before the summer of 1898? A. Not that I know of.

Q. What proportion of your total load is the arc light load in your new or modern installation? A. I cannot answer that off-hand without looking the matter up.

Q. Well, approximate it. Two thirds? One third? A. I couldn't answer even within a third, whether one third or two thirds.

Q. That is, you can't even approximate it? A. I shouldn't want to, no, sir, not now, without looking the matter up.

Q. In your ideal or modern plant you only have \$1,200 worth of transformers for your incandescent lighting? A. Those two items of transformers, lamps and transformers, I have got mixed up on, and I don't remember just now how those were divided.

Q. I notice that you have the cost of your pole system for your modern plant about \$10,000. A. I don't know just what I have included in that, that pole system, so I cannot answer as to whether I agree with you or not.

Q. I mean, of course, the pole and the pole equipment. A. I don't know how much you include in that, Mr. Brooks.

Q. Well, in your modern plant I include whatever you do. I don't know. You make it less than \$10,000. A. Do you include the wires too?

Q. No, sir. A. I can't answer your question. I don't know what you want.

Q. Well, your poles set, for modern system, you put in at \$6,000. A. Yes, sir.

Q. You have got wire, cross arms, etc., \$8,000? A. Yes, sir.

Q. How much of that is cross arms, etc.? A. I don't remember now what that is.

Q. How much did you allow for in your modern system for your poles and the equipment of the poles, excluding wires, approximately? A. Well, approximately, I should think about \$12,000.

Q. For your modern system? A. I think so, without going into it definitely.

Q. Then you have \$4,000 worth of cross arms in your modern system to \$6,000 worth of poles? A. Why, no, not at all.

Q. Give me the items which make up that cost of poles and equipment. A. I told you that I haven't the items with me.

Q. You have just given me an estimate. A. You asked me to state approximately; I have stated approximately.

Q. You told me approximately about \$12,000. Now itemize it approximately. A. I cannot do it.

Q. Didn't you just do it? A. I did it very roughly.

Q. Now I ask you to give it approximately to me. A. I estimated approximately just now, to answer your question, poles set, \$6,000; the cross arms, pins, insulators, brackets, and all that miscellaneous truck, except the wire, approximately \$2,000, and labor between \$1,000 and \$2,000, and then the engineering incidents which made up, as I said, about \$12,000.

Q. Then, excluding engineering, your pole equipment, as you roughly approximate it—your poles and equipment for your modern system, as you roughly estimate it—amounts to \$9,500? A. Somewhere in that neighborhood.

Q. Will you turn to pages 38 and 39. You have the cost of the present pole system, do you not, of the electric plant of the Holyoke Water Power Company, excluding engineering and wiring, more than \$12,000? A. Yes.

Mr. BROOKS. I think you may inquire.

Re-direct examination by Mr. GREEN.

Q. You were asked in the cross-examination in regard to a Mr. Robb who is with Stone & Webster. Can you tell us whether or not along in November, 1899, Mr. Robb went anywhere? A. Yes, sir; Mr. Robb went to India in November, 1899.

Q. And when did he return? A. He came back in March, 1900.

Q. So far as you know, did Mr. Robb do anything whatever in regard to the preparation of the schedules which you have submitted?

Mr. BROOKS. I object to that question.

The CHAIRMAN. He asks so far as he knows. I think that is competent.

A. He had nothing whatever to do with the preparation of my schedules.

Q. You were asked, Mr. Blood, on Saturday, in regard to the opinion that you expressed as to the value of the combined plants under certain assumptions, one of paying \$72,000 as bonus for

the privilege and land and \$24,000 rental, and then \$72,000 bonus and \$12,000 rental, and \$36,000 bonus and \$12,000 rental. Will you show us how, by the use of any schedules submitted by you, that result can be figured?

Mr. BROOKS. I object to it. I cross-examined him as a result of their direct examination, and only generally. This must have been part of their case, if it constitutes part of it now.

Mr. GOULDING. Didn't they go into it?

Mr. BROOKS. They went into it, certainly—put in this schedule.

The CHAIRMAN. You went into this originally.

Mr. GREEN. No, I asked simply his opinion under those propositions. Then it was asked if he had the details with him, and he said he did not have the details of those figures, he had simply figured it out and got his result. Now whether I have asked it or not, the witness can show the Court in a moment, how, by the use of two schedules, the details can be put together, and if I omitted it I should like to put it in. If I did not, I should like to have the witness show it to the Court.

The CHAIRMAN. Very well.

Mr. BROOKS. I withdraw my objection. I would like to have him tell us the pages.

Mr. GREEN. Pages 22 and 23.

The WITNESS. Now will the stenographer read the question so I can get the exact amounts.

(The question was read by the stenographer.)

Q. I won't stop to ask you to work it out now, Mr. Witness. I want you to explain how it can be worked out; it is only a moment's work. I think I can shorten this, Mr. Blood, if you will follow me a moment. Take the schedule on page 22, the cost to operate the remodelled plant by water 303 days per year and 62 days per year by steam. You say that shows no value, as you stated in the beginning, for the water power plant itself? A. No, sir.

Q. And that is based on a rental of \$4,130, is it not? A. Yes, sir.

Q. You subtract \$4,130 from \$23,105—if I can supply these figures—and you get \$18,975, which represents the running of the plant without any fixed charges on the cost of the water plant and without any rental? A. Yes, sir.

Q. Now if you add to that the fixed charges and rental, on either of the various propositions given, you will get the cost of running it on those propositions, will you not? A. Yes, sir, you will.

Q. And on the next page you have the cost of running this remodelled plant by steam alone? A. Yes, sir.

Q. Take, for instance, the very first proposition of \$24,000 rental. If you should add the rental alone—

Mr. GOULDING. What do you say, the next page?

Mr. GREEN. Page 23, running the plant alone by steam.

Q. Going back to page 22, and taking \$18,975, if you add the rental item of \$24,000 alone to that— A. Without any fixed charges, that would make the cost of operation \$42,975, which is considerably more than \$30,709.

The CHAIRMAN. The same rule applies to the others.

Mr. GREEN. Yes.

Q. And by computing the fixed charges and the fixed charge rate, why, that increases the difference? A. Yes, sir.

Mr. GREEN. I simply wanted to show the method. The figures lie right there. That is all I care to ask about that.

Q. You were asked in regard to the Lowell and the Brockton plants. You stated, as I recall it, that you did some things in regard to the engineering at Brockton and Lowell and advised some changes there—some remodelling. Have you any objection to telling us what those were?

Mr. BROOKS. How is this of any competency, may it please your Honors? He put in his testimony in his direct. He said he had something to do with them. It appears in the testimony.

Mr. GREEN. I thought from something brother Goulding said perhaps you would like to have me ask it. Mr. Goulding suggested that it would be shown from this witness that plants had been remodelled, and this witness had had to do with the remodelling of the plants, which were not along the line, so far as designs are concerned, with the plans suggested for the remodelling of the Holyoke plant.

Mr. BROOKS. We, of course, were prohibited from going into any valuation of his that had not been made public property.

The CHAIRMAN. I don't believe it will help us any, Mr. Green.

Mr. GREEN. I offer it on the line of the method of remodeling plants and the way they were actually remodelled and laid out, as bearing upon his testimony. If you do not want it, all right.

Q. I would like to have you explain one point that I didn't understand. You spoke at one point of something—I thought it was valuation, I may have mistaken you—in regard to the plants at Tampa and Savannah and Lowell and Brockton. Afterwards I understood you to say that you had valued no plants in Massachusetts. A. I think I made that statement, yes.

Q. Then I would like to understand just what you had to do with the Tampa, Savannah, Lowell and the Brockton plants.

Mr. BROOKS. I submit that was opened up in his direct.

The CHAIRMAN. I think it was, Mr. Green. I think he told us particularly about it.

Mr. GREEN. Both Mr. Matthews and myself understood that some statement was made in reply to a question that the witness had valued those four plants, and I want to leave it clear. I do not have the question before me that was read to him, and to which he made an answer.

Mr. BROOKS. It is page 1,547 of the direct examination.

Mr. MATTHEWS. On cross-examination the witness said first he had valued the plants at Lowell and Brockton; then he said he had not valued any plant in Massachusetts.

Q. To be sure it is clear, did you make any valuations at Lowell and Brockton? A. No, I did not.

Q. You were asked if you knew of any plant which had established a business and obtained subscribers in six months, where the results could be comparable with Holyoke. You were asked in that same connection if you had known of such a case where the business had netted a certain amount of money—\$23,000, I believe was the figure used. Have you known of such results, where the amount of business obtained was comparable with the amount of business in Holyoke? A. Taking populations into consideration?

Q. Yes. A. I do, yes, sir.

Q. That is, judging by the output of the plants. You were asked if you had acted as a steam engineer in plants doing a commercial electric business in Massachusetts. Whether or not you

have had experience as a steam engineer in commercial plants or other electric plants generally?

Mr. BROOKS. I submit he went into that in direct and cross both.

Mr. GREEN. If he went into it in direct—I am having to go somewhat by memory—

The CHAIRMAN. I think I recall that he stated he had had some engineering experience, not confining it. I wouldn't be dead sure of it. You examined on his qualifications very thoroughly. However, if you think you ought to ask him, go ahead.

Mr. GREEN. I am afraid I have forgotten it, that is all.

The CHAIRMAN. What do you say, Mr. Witness?

A. Not as an operating engineer. I have had more or less to do with operating engines and steam plants in general, in first starting up plants which I have built.

Q. Now you were asked if you had personally conducted a test to determine the cost of steam power per horse power hour. Whether or not you have been personally present at such tests?

A. I have in this way: That I have, with others, had those tests conducted under our supervision, in almost all the plants that I have had to do with, and covering a long space of time. In fact, they are going on all the time, continuing right now, today, as we are getting at the actual results of the operating conditions of the plants; a continuous test, you might say.

Q. You were asked if you had made these engines compound, and some questions were asked you in regard to estimates which you had made. In that connection you stated that you had some talk with some steam engineer. I want to ask now why you didn't use engines compounded?

Mr. BROOKS. I object to it.

Mr. GREEN. I do not want any inference drawn against the witness that he started on some estimate and then destroyed it. I think he should be allowed to state why he didn't proceed further with his figures on compounding.

The CHAIRMAN. We will admit it.

A. I made an estimate on this basis, and after consulting with an engineer who does this kind of work, that is—

Mr. GOULDING. We do not understand that the talk with the engineer is competent.

Mr. BROOKS. That was my objection.

Mr. GREEN. It is simply his own reason for not proceeding further.

The CHAIRMAN. State your reason for not proceeding further. You cannot state what the engineer said to you.

Q. Don't put in what he said, but state your reason. A. Because these engines compounded would not have been satisfactory. They would have been too large for the plant. They wouldn't have been structurally in good shape to run when they were compounded, and for that reason I destroyed my estimate I had made on that basis.

Q. Will you turn to pages 18 and 19. On page 19 you have an item of "Labor on Repairs." Your attention has been called to the fact that that item does not appear on page 18. Why not?

A. Because, as I understand, this item, which I took from the previous testimony, of distribution labor,—that did not cover the repairs; and for that reason I added in an item which covered repairs.

Q. Well, have you labor on repairs treated in any way in your schedule on page 18? A. That comes in under the question of miscellaneous repairs, and also labor would come in under the item of "Labor"—labor on repairs.

Mr. GOULDING. Is that on the same page, 18?

The CHAIRMAN. Yes.

Q. You were asked in regard to the loss of power in belting and shafting, varying from 5 to 30 per cent. under different conditions. Will you tell us whether that estimate applies to a loss in the same plant or losses in various plants? A. That difference in variation from 5 to 30 per cent. I meant to refer to various conditions in different plants; that is, that the loss in a plant in one place might be 5 per cent. and the loss in a plant in another place might be 10 and in still another it might be 30. The loss in that one particular plant does not vary very greatly, that is, the actual horse power consumed. The percentage of the friction load—the losses in shafting—to the actual load, of course varies as the load varies.

Q. Will you kindly, during the noon hour, look up your transformer items, so that you can tell us in regard to those two items in your new plant? A. Schedule F?

Q. Yes, Schedule F. A. I can refigure it.

Q. Will you refigure that, so that you can tell us in which of those items the arc transformers occur. Will you refigure for us the details of the new plant?

The CHAIRMAN. You do not mean the entire new plant, do you?

Mr. GREEN. Yes; he has not the details and I would like to offer them. He said he could refigure them. Now we should like to have him do that and offer them to the other side for their inspection, if they desire.

Mr. BROOKS. I suppose it would mean his figuring back.

Mr. GREEN. If you do not care for them, all right.

The CHAIRMAN. Should you object to that, Mr. Brooks?

Mr. BROOKS. No, sir.

The CHAIRMAN. I think personally that I do not approve of it.

Mr. BROOKS. I want to say if it is going in it is thoroughly understood that we shall have a chance, of course, to cross-examine with reference to it. It is part of their case originally.

Mr. GOULDING. I do not myself see any reason why we should have a refiguring, or a figuring from the schedules back to the data.

Mr. BROOKS. That is what it would mean; it would mean figuring back from his conclusions to his schedule.

Mr. GREEN. We do not care for it if our friends do not. It seemed to me that was something that they were entitled to, and if they desired it we desired to have the witness take his figures up again and furnish the details, if they would like to see them. If they do not care for it, we do not care for it.

Mr. GOULDING. We ask for bread and they give us a stone. What we wanted was the basis on which he constructed this schedule, not what he might figure to fit it after it was made.

Mr. BROOKS. Yes, we should have been very glad of the original figures.

Mr. MATTHEWS. Can you reproduce the original figures? Can you do that, Mr. Blood?

The WITNESS. No, sir, I don't think so. I may have them in my desk.

Mr. MATTHEWS. Well, if you will look and see if by any chance you have the details.

Q. Will you turn for a moment to page 6, or rather to page 12, where the same items come up. A. Yes.

Q. Will you follow through, so as to make clear what I think was not perhaps made clear, so as to show us where you get the figure of \$3,750 for the steam engine building, concerning which Mr. Brooks asked you?

The CHAIRMAN. That is clear enough to me; I don't know whether it is to the other members of the Commission? (turning to Mr. Cotter and Mr. Turner.)

Mr. GREEN. Well, if it is clear—

(The Commissioners consulted.)

Mr. GREEN. I understand the Commission, then, understand this?

The CHAIRMAN. Yes.

Q. You were asked if in any way you could separate the items of depreciation allowed for age and for condition, and for suitability—

Mr. BROOKS. I didn't ask any such thing as that.

Mr. GREEN. I have it down here, what I understood to be your question.

Mr. BROOKS. I asked him if he could separate them. He said he had three kinds of depreciation allowance in here, age, condition and the results he obtained by comparison with a model or ideal plant, and I asked if he could separate the three, and he said he could not.

The CHAIRMAN. He said he could, didn't he?

Mr. BROOKS. He said he could not.

The CHAIRMAN. Now you want to ask him whether he can?

Mr. GREEN. I haven't the question here; I have in my notes the words, "Suitability. I have separated the depreciation of suitability from age and condition." I intended to take down the question; I can only rely on my notes.

The CHAIRMAN. He said he could?

By the CHAIRMAN.

Q. As I understand, Mr. Witness, you can tell? A. As I remember my statement, I said I could not separate the age and condition.

By Mr. GREEN.

Q. Now, if age and condition were put together, can you separate the depreciation allowed for age and condition from the depreciation allowed for suitability? A. Yes, sir; that is what I endeavored to do in these schedules.

Mr. BROOKS. (To the witness.) You say you endeavored to do this in your schedule—where, what page?

Q. Will you tell us where the depreciation for age and condition shows? A. You will find the depreciation for age and condition shown in schedules D and E.

By Mr. GOULDING.

Q. What page?

Mr. GREEN. Beginning with 45.

A. 45 and 46, the summary of those two items. What I depreciated on account of age and condition, and suitability is indicated in schedule A, on pages 5, 6 and 7. The difference between those two would be the depreciation on account of suitability.

The CHAIRMAN. It is simple. Here it is demonstrated in these schedules. We understand these schedules—

Mr. GREEN. Yes, but I—

The CHAIRMAN. —to a large extent, and so long as the schedules speak for themselves, why should you feel called upon to give testimony in regard to it? I suppose the office of the schedule is to supply the place of testimony to some extent.

Mr. GREEN. Our friends asked a question across the table, which led me to ask that one. I did not understand that they understood where it was.

Mr. BROOKS. Yes, we asked for the pages where this showed up.

Mr. GREEN. They asked us about it.

By Mr. GREEN.

Q. You were asked about the efficiency of a Schuyler dynamo. You stated the efficiency at its maximum load, or rather, "at its full load"—I think was the term used. What would you say of the efficiency of the Schuyler dynamo at a small load?

Mr. BROOKS. How is that competent? He has already said he never made a test, and didn't know anything about it.

The CHAIRMAN. You asked him with reference to one subject, and they ask him with reference to another.

Mr. BROOKS. He said he didn't know anything about it.

The CHAIRMAN. He said, I think, 85 per cent., or something of that kind?

Mr. GREEN. He said 70 per cent. at full load.

The CHAIRMAN. 70 per cent.?

Mr. BROOKS. He said he knew nothing about it, and I dropped it. He said he never had made the test.

Mr. MATTHEWS. He didn't say he didn't know anything about it. He said he hadn't made a test.

Mr. BROOKS. And he knew of no test.

Mr. MATTHEWS. He knew the efficiencies of the dynamos.

The CHAIRMAN. Now, let the witness clear it up if you wish to, Mr. Green, if he can make it clearer. Now, what is it, on nominal load?

Mr. GREEN. On small load or medium load.

A. The efficiency on small load would run away down; probably on light load not much more than 20 or 30 per cent.

Q. You were asked about the efficiency of the General Electric alternator, and I understood you to say it is about 85 per cent. at full load on the tests you have made at Lynn, and in regard to the alternator in your remodelled plant, I understood you to state about 90 per cent. Is the question of efficiency the only question that enters into your mind in making the change from the General Electric alternator to the 100 kilowatt alternator? A. No, sir.

Q. What else enters into it? A. The new machines—

Mr. BROOKS. How is this competent?—all right, I withdraw my objection.

A. (Continued.) The new machines are of more modern type, and while they are more efficient, mechanically and electrically, they are much nearer perfection, so that the liability to trouble with them is very largely reduced. In every way they are a more desirable machine than the older type of machine. They also run at a slower speed; the number of cycles per second is less.

Q. Well, would the new machines be single-phase machines or two or three-phase machines? A. The new machines would

be also two-phase instead of single-phase like the old machines.

Q. Were the plants that you alluded to, that had three systems in use in 1898, old or new plants?

Mr. BROOKS. Well, wait a moment.

The CHAIRMAN. I did not hear the question.

Mr. GREEN. (To the stenographer.) Read it, please.

(The question was read by the stenographer.)

Mr. BROOKS. How is that of any consequence whether they were or not?

The CHAIRMAN. I don't think, Mr. Green, you had better go into that.

Mr. GREEN. I didn't hear that.

The CHAIRMAN. I don't think you had better go into that.

Mr. MATTHEWS. It was opened up on cross-examination.

The CHAIRMAN. Very likely it was. I don't understand what the question refers to, I must confess.

Mr. GREEN. He was asked if it was not common practice in Massachusetts in 1898 for electric plants, electric commercial plants, to use three systems of dynamos or generators. I think in a general way he intimated that they were old plants, but I wished to make that sure and ask a question on top of it.

Mr. BROOKS. I do not know how it is of any consequence.

Mr. GOULDING. Plants that were old and tried.

Mr. GREEN. Old and tried and found wanting is what we purpose to show in a moment.

The CHAIRMAN. I think the witness covered that, Mr. Green.

Mr. GREEN. You think the witness covered that?

The CHAIRMAN. I think the witness covered that in his cross-examination.

Mr. MATTHEWS. If the witness said they were old plants that is all right, but does your Honor recollect that he made that statement?

The CHAIRMAN. That is the impression left on my mind.

Mr. GREEN. He left that impression on mine, but I was not positive as to the fact whether it was stated or not.

The CHAIRMAN. Everybody knows that electric light plants are not put in in a night, and must have been in use on that date. The Commissioners are supposed to know something.

Mr. GREEN. The point, if your Honors please, is this—

The CHAIRMAN. We will admit the evidence, Mr. Green. We will stop the discussion on any such point as that.

Mr. GREEN. (To the stenographer.) Will you read that question?

(The question, "Were the plants that you alluded to, that had three systems in use in 1898, old or new plants?" was read by the stenographer.)

Q. I mean by that arc, incandescent and power, three systems.

A. They were old plants I had in mind.

Mr. COTTER. What was the answer?

The WITNESS. They were old plants.

Q. Do you know of any new plants along the latter part of 1897 or 1898 adopting those three systems for service?

Mr. BROOKS. I object to that.

The CHAIRMAN. Read the question, Mr. Stenographer.

(The question read by the stenographer.)

The CHAIRMAN. I think you have all you want, Mr. Green, and all we ought to give you. We will hear you on it though, if you desire to be heard.

Mr. MATTHEWS. Does your Honor exclude that on the ground that it was asked on direct-examination?

The CHAIRMAN. No, but that that other answer covers it, —practically the other answer covers it.

Mr. MATTHEWS. In this case, "old" has been used in the sense of existing, that is to say, in the sense of an existing plant as contrasted with a non-existing plant. Mr. Green's question which is now pending was simply intended, I think, to make it clear that what the witness meant by "an old plant" was a plant that had been in use some time, and was not a plant newly built in 1897 or 1898. If that is clear, we have no desire to press it.

Mr. GOULDING. It seems to me they have gone as far as they are entitled to if they have shown that the plant is old. Now, they ask a new question, whether there was any established within a certain time, which is novel and not anything we have opened.

Mr. GREEN. It throws light on the thought which underlies the other question.

Mr. COTTER. We do not think any further inquiry on that subject will help us.

Mr. GREEN. Very well; I would like to ask this question then:

Q. Considering the old plants that you have alluded to that did have the three systems for service, do you know whether or not they have been generally remodelled?

Mr. GOULDING. I object.

Q. Or any of them?

The CHAIRMAN. That is not open on re-examination.

Mr. MATTHEWS. We could not go into it at all on direct examination, as I understand it. If we cannot go into it on re-direct the whole benefit of this discussion, which might be very fruitful, is confined to the other side.

The CHAIRMAN. The question was put on cross-examination whether or not it was not common practice on January 1st, 1898, to use these different methods, and the witness said in the majority of instances, yes. Now, you have been allowed to show that those related largely to, or were made up of old companies. Now, your present question is what, Mr. Stenographer?

Mr. BROOKS. Whether they have been remodelled since.

Mr. GREEN. Or were under the process of remodelling in 1897 or 1898.

Mr. GOULDING. That is, the acts of some parties that own some plants here and there are alleged to be competent evidence, their acts since 1898 in the matter of their machinery.

Mr. MATTHEWS. We do not allege that. We simply say it is competent because the question was asked by the other side.

Mr. BROOKS. I have not opened any such line.

Mr. GREEN. The argument which I supposed underlaid the question of Mr. Brooks was: Here is a lot of plants, and it is common practice to operate them so and so; therefore your Honor is to give some benefit of that to this plant, the Holyoke Water Power Company's. We suggest in answer to that: Maybe there were plants like this, but I think it will develop that beginning in 1896 and 1897, through 1898 these very plants that the witness had in mind were, and I think all that he had in mind, under the process of being remodelled. Now, if that is so, it would have a bearing upon any result there might be.

The CHAIRMAN. Perhaps this would discontinue the discussion if I make the suggestion that this witness in direct-exam-

ination took the fact of these changes into account; he didn't go into them in particular, and I don't think we ought to. If we open up a question of this kind it is trying the case largely on collateral issues; it tends to confuse the minds of the Commissioners; it draws them away from the real points to deal with multitudinous questions of this kind. The witness on direct-examination explained, as I understood him, that the old plans were being changed, that the new system was coming into vogue. That seems to me to be as far as you ought to go on that. We cannot undertake to deal with ten thousand different propositions that come up; for instance, here you might lead us into all these different buildings—

Mr. GREEN. I will withdraw the question.

Mr. BROOKS. (To Mr. Green.) Wait just a moment, please.

Mr. GOULDING. His Honor, the Chairman, made a statement in the course of the ruling which we do not accept as true. I do not understand—I mean as to the evidence—that this witness has made any statement or has been allowed to make any statement as to what is generally taking place about re-organizing, and the fact is not so and we do not want it to be assumed that this witness has undertaken to testify to that.

The CHAIRMAN. I don't think you understood me, Mr. Goulding. As I recall the testimony of this witness, he did testify that modern conditions were more valuable, modern appliances and modern inventions, and I understood him also that they were being used. If I am wrong about that, call my attention to the evidence, please.

Mr. GOULDING. I did not understand him to make any statement that the plants in use in this Commonwealth were shifting their conditions from the old conditions into the new conditions. I had not heard of it.

The CHAIRMAN. I don't think I went to that extent. At any rate, if you will let me see the evidence I will see what he did say. I don't know anything about it personally at all, of course.

Mr. GREEN. Here is the first day's evidence.

(A volume of testimony was handed to the Chairman.)

The CHAIRMAN. It is probably covered in this. If you will go ahead on something else, Mr. Green, I will undertake to see what he did say.

Q. You were asked at one point if you knew what the earnings were of the Holyoke Water Power Company in their electric business. A. I was asked, yes.

Q. Let me ask you, do you know anything about it beyond Mr. Foster's—is that the gentleman's name—beyond Mr. Foster's figures as set out in the evidence? A. Only such other things as I picked up in reading the evidence that was already in.

Q. Whether or not you made any independent investigation? A. No, only as I think I also testified, that I had looked over the Gas Commissioners' report, as I have done.

Q. You were asked if you knew of any new plant that was built in January, 1898, that was built on the principle suggested in your new and modern plant, the use of one system; do you know of any plants that were installed in 1898, early in 1898, that did use that system?

Mr. BROOKS. We object to it. He has already said that the first one that he knew of was in the summer of 1898.

Q. Do you know—I will strike out that question and take that up—do you know of any plant installed in the summer, or whenever it was in 1898, which was planned in January, 1898?

Mr. BROOKS. Well, I object to that.

Mr. COTTER. That may be excluded, I think. We do not think that would help us, Mr. Green, especially on re-direct.

Mr. GREEN. Our suggestion is this, that this witness suggests that in January, 1898, he should have installed if he was building new a system which would use the constant current transformer and be a single system. He also suggested that if he had been remodeling the plant he would use these six months as he outlined here. Now, the argument would be that the plant was not actually built. I forget whether the question was limited to Massachusetts; I think it was applied generally. Now, I should like to ask him whether or not the plant or plants, one or more, that were built were not in fact laid out, contracted for and planned on that system in January, 1898.

Mr. BROOKS. I will withdraw the objection. I have some curiosity to see what he will say about it.

Mr. COTTER. Answer the question as directly as you can, Mr. Witness.

A. I do know of one plant that was laid out on this general principle, on this general line, early in the year 1898.

Mr. BROOKS. Well, now, I say that is not responsive to the question.

Q. How early in 1898? A. The work, I think, was started either in January, 1898, or in December, 1897.

By Mr. BROOKS.

Q. Is that plant using the constant current transformer? A. It is not.

Mr. BROOKS. Then I submit, may it please your Honors, that this is—

The WITNESS. I would like the opportunity to explain that.

By Mr. GREEN.

Q. Now, will you explain what you mean by a plant on this general line?

The CHAIRMAN. I don't quite see why we should not have a limit to this examination of your witness.

Mr. BROOKS. We certainly object to that.

Mr. COTTER. We would have excluded the other question if you had not withdrawn the objection.

Mr. BROOKS. Yes, I withdrew my objection.

Mr. COTTER. You having withdrawn your objection to that question, the query is whether this throws any light on the same question. I am free to say that personally it seems to me better that he should answer that.

(The last few questions and answers were read by the stenographer.)

Mr. GREEN. I desire to have him make that explanation.

Mr. COTTER. If it is in the way of explanation we think the question had better be answered. We would have excluded the other question if you had not withdrawn your objection.

Mr. BROOKS. I understood that the question was, a plant like his modern plant; that was the original question.

Mr. COTTER. He says this is in the way of explanation of something he testified to. We will hear him.

A. The plant at Concord, Mass., was laid out on this general line, that is, 2-phase, direct-connected alternating current dynamo, so as to run the entire system with one dynamo or one unit. They put in two units so that the thing would be interchangeable, and that was all installed except the arc lights running off of con-

stant current transformers. That subject of arcs running off constant current transformers was looked up and considered at that time, and they saw that it was a thing which was a coming thing and which they would undoubtedly use—

By Mr. COTTER.

Q. You are giving us your own observation? A. Yes, sir.

Mr. GOULDING. I would like, when the time comes when the answer is finished, to call to your Honors' attention whether it is a responsive answer.

A. (continued) But the town, instead of using arc lights, decided for some reasons best known to themselves, largely on account of trees, I think, to use incandescent lamps. For that reason constant current transformers have not been installed as yet.

Mr. GOULDING. I think a large part of that answer ought to be stricken out; about its being the coming light, or the coming method ought to be stricken out.

Mr. COTTER. We will reserve that question. If there is any part of it that is based on other information than his own, that part ought to be stricken out.

Mr. GOULDING. What other people saw to be the coming thing I don't think is competent.

Mr. COTTER. Yes, we will agree with you in regard to that. Anything further, Mr. Green?

Mr. GREEN. Sir?

Mr. COTTER. Anything further?

Mr. GREEN. I am looking through my notes to see if there are not some things I can omit.

Mr. MATTHEWS. Perhaps we had better adjourn here.

Mr. GREEN. I will look over these notes, and I can probably cull out a large number and put into two or three questions all I have left. It is within a few minutes of one o'clock, and I can probably save time by so doing this afternoon.

(Recess till 2 P.M.)

AFTERNOON SESSION.

WILLIAM H. BLOOD, JR., *resumed.**Re-direct examination by Mr. MATTHEWS, continued.*

The CHAIRMAN. I want to say, gentlemen, about that subject which we were discussing, that before ruling I should prefer to read the evidence that has already gone in on that subject. I am inclined to think—I have glanced over the testimony—that I made my statement stronger than the fact. But I will look it over, and if necessary qualify it. If we admit this evidence, this witness may be recalled again on that subject.

Q. You were asked, Mr. Blood, by Mr. Brooks, whether you had built an electric light plant in Massachusetts as a whole, that is, any entire plant, referring to steam plants. I will ask you whether you have superintended the erection of any steam plant or built any steam plant in part, for use in connection with an electric light station in Massachusetts? A. I have, in part.

Q. Where? A. I have had something to do with that class of work at Brockton, and also at Lowell.

Q. You were asked by Mr. Brooks whether you could mention any plant of the same size as the Holyoke plant that was operated for a certain expense annually for lubricants. I will ask you to state generally how you reached your allowance for lubricants and the other details of operation.

Mr. GOULDING. I submit that is not opened by the cross-examination.

The CHAIRMAN. Mr. Matthews, do you want to be heard on this subject?

Mr. MATTHEWS. My only point in pressing this question is that I do not think it is entirely clear what the witness did and how he reached these operating costs. If it is clear I do not desire to take up the time of the court with questioning the witness on the subject. He was asked by Mr. Brooks whether he could

mention any plant of this size that was operated for an annual cost for lubricants of \$300, if I remember the figure correctly, and he said he could not, I believe. That, it seems to me, requires an explanation by the witness as to the general manner in which he reached his operating charges, unless he gave it in his direct examination. I do not remember that he did.

Mr. COTTER. We think, Mr. Matthews, that he did touch upon that in a measure in chief, so much so that it is not reopened; and further, we feel that further evidence on that subject would not be instructive to us.

Mr. MATTHEWS. Does your Honor mean that it would not be instructive if the witness had not said anything about it in the direct examination?

Mr. COTTER. He has said so much that we feel that we know pretty nearly what he means.

Mr. MATTHEWS. That settles the question, then. I have no desire to press it.

Q. You were asked something by Mr. Brooks about Schuyler dynamos. Do you know whether those machines are now manufactured?

Mr. BROOKS. Wait a moment; I object to that. Have I brought anything of that kind out? The only thing I asked him was if he made any test of the Schuyler dynamos or saw any made, and he said no.

Mr. MATTHEWS. The witness was asked in detail several questions about Schuyler dynamos and their method of operation, and I should like to show by this witness that they have not been manufactured for several years, if such is the fact.

Mr. BROOKS. I asked him nothing about Schuyler dynamos or their method of operation.

Mr. MATTHEWS. I certainly must take issue there. You asked him if they were economical to operate, and he said they were not. You asked him quite a number of questions about these Schuyler dynamos.

Mr. BROOKS. He said in his direct examination that they were inefficient.

Mr. MATTHEWS. Yes.

Mr. BROOKS. And I asked him what the inefficiency consisted of, and then I asked him if he had ever made any personal

test or seen any test or known of any test made of them. He said no.

Mr. MATTHEWS. He said more than that. I want simply to bring out the fact, if it be a fact—or rather, not to state the fact myself—I want to ask him whether these machines are now upon the market.

Mr. BROOKS. What has that to do with the question that is before us?

Mr. MATTHEWS. I should think it might have considerable to do with the value of Schuyler dynamos for lighting. I do not care to argue it any further.

The CHAIRMAN. If you overlooked that in the direct examination, Mr. Matthews—

Mr. MATTHEWS. I do not care to put it on that ground. It is a fact that we can show by other witnesses. If your Honors think it is not open to us, we will let it go. It has been already testified by one or two of the witnesses for the other side that these dynamos have not been on the market for some years. I would like to have this witness state it if he knows it; if not—

The CHAIRMAN. I do not think he can on re-examination.

Mr. MATTHEWS. Very well.

Mr. BROOKS. Of course, may it please your Honors, I take a broader ground than that in my objection. I say it is not competent anyway.

The CHAIRMAN. Why not, if you have Schuyler dynamos there?

Mr. BROOKS. Because it comes back, does it not, to the question of 1898?

The CHAIRMAN. All right, but they want to value it for 1900.

Mr. MATTHEWS. Oh, no, I think counsel misunderstands me. My question should have been whether they were manufactured and for sale on the market in January, 1898. I did not intend to draw any distinction between that date and the present. If that question is excluded, I will pass on.

The CHAIRMAN. Yes.

Q. You were asked by Mr. Brooks whether you would value the plant for bonding purposes as you have valued the plant in this case.

Mr. BROOKS. I did not ask him any such question as that.

The CHAIRMAN. He asked some other witness.

Mr. MATTHEWS. I am sorry to say that I tore up my notes just before noon. The question, as it appeared by my memorandum of the evidence, was this, I think: "Would you value this plant as you have in schedule A for bonding purposes?"

The CHAIRMAN. He did ask somebody, but I do not think he did this witness.

Mr. BROOKS. No, your Honors will remember the several minutes that were passed in his failure to understand my question. I do not think I got any answer from him.

The WITNESS. Your Honor, I answered a question very similar to that.

The CHAIRMAN. Well, I will take the witness's recollection, then; he is under oath. You can ask the question; go ahead, Mr. Matthews.

Q. I would like to inquire, Mr. Blood, what you would value if you were valuing the plant for bonding purposes?

Mr. GOULDING. This plant?

Mr. MATTHEWS. I am asking with reference to Mr. Brooks's question, which was upon the plant at large—not particularly this plant. Mr. Brooks's question had reference to the method of valuation, and the obvious purpose of his question was to bring out the fact that the witness would not value a plant for bonding purposes as he valued this plant in schedule A. I would like to ask the witness and have asked him if he were valuing the plant for bonding purposes, what he would include in the valuation?

The CHAIRMAN. What he would include in the valuation?

Mr. MATTHEWS. Yes.

The CHAIRMAN. Do you object to that, Mr. Brooks?

Mr. BROOKS. Yes. How is it competent here, may it please your Honors?

Mr. MATTHEWS. I do not think it is competent except by reason of the question which you put.

Mr. BROOKS. I say I never put any such question.

Mr. MATTHEWS. I think you will find that you did.

The CHAIRMAN. You will have to settle whether you did or not; I do not remember anything about it. I remember distinctly about some other witness.

Mr. MATTHEWS. This is the question, on page 1776 of the stenographic minutes on Saturday, December 22, 52nd hearing:

"Q. Do you mean to say that in schedule A you value this plant as a running plant? A. Yes, sir.

"Q. Is that the way that you think your concern, or you, would have valued it for the purpose of bonding it? A. Most assuredly, no."

And I now ask the witness what he would have included in his valuation if he had made it for the purpose of bonding it, or how he would have made a valuation for the purpose of bonding it?

Mr. BROOKS. I understood you to put him the general question, Mr. Matthews.

The CHAIRMAN. Mr. Brooks, we think he has a right to make that explanation.

Mr. BROOKS. Yes, but the question that came was a general question.

Mr. MATTHEWS. I want the last form of question to be considered as a substitute for the first, Mr. Brooks.

Mr. BROOKS. Very well.

The CHAIRMAN. You can answer the question, Mr. Witness.

A. If I were bonding simply the plant as a structural concern I should have done it in that way. If I were bonding the plant, including the franchises, good will and business, I should not have done it that way.

Q. When you say "that way," you mean as appears in schedule A? A. In schedule A, yes, sir.

Q. On pages 1779 and 1780, you were asked these questions:

"Q. Supposing that you owned a paper mill that was producing you \$23,000 a year net, would you sell out your whole connection and your whole interest for \$61,390? A. That depends entirely upon the conditions, which I should want to know.

"Q. Well, if it had been producing you \$23,000 right along, no cessation of net income in sight, would you sever your interest and sell it out for \$61,390? A. I don't think that is a comparable case."

I want to ask you why you do not think it is a comparable case?

Mr. BROOKS. Can this be competent, your Honors?

Mr. MATTHEWS. Only competent by reason of your questions, that is all.

Mr. BROOKS. He answered my questions that he did not think it was a comparable case. Can he go into the mental processes through which he went in giving that answer?

The CHAIRMAN. The witness concludes that proposition by his answer. I do not see why you want him to give the reasons for that, Mr. Matthews.

Mr. MATTHEWS. I have only one question further, if your Honors will permit me to find the place in Mr. Brooks's cross-examination to which my question relates.

The CHAIRMAN. Yes.

Q. Mr. Blood, you were asked a number of questions concerning the method employed by Stone & Webster for the valuation of electric light properties. I will ask you whether, so far as you know, their method of valuing an electric plant is substantially the same as that followed by you in this case?

Mr. BROOKS. Wait a moment; we object to that. I say that if I endeavored to ask him about the methods that they employed, it was excluded.

The CHAIRMAN. Read any evidence that you have.

Mr. MATTHEWS. I will call the attention of the Commissioners to a number of questions. For instance, on page 1777 the question is this:

"If you were called upon by Stone & Webster, for the purpose of the sale of the entire concern, to put a value upon the concern, would you have put this value that you have stated here in schedule A?"

Mr. BROOKS. What has that got to do with Stone & Webster's valuation?

Mr. MATTHEWS. Well, Stone & Webster are mentioned. "If you were called upon by Stone & Webster." There had previously been extracted from the witness the fact that he was in the employ of Stone & Webster, and that they were engaged in the general business of electric lighting.

The CHAIRMAN. They were allowed to show the method of Stone & Webster themselves.

Mr. MATTHEWS. So far as this witness knows only. Here is another question—

The CHAIRMAN. It is what this witness will do. We do not care, so far as he is concerned, what Stone & Webster did.

Q. Is the method adopted by you in this case the same method that you adopt in your valuations for Stone & Webster?

Mr. BROOKS. I object to that.

The CHAIRMAN. Re-read that question.

Mr. MATTHEWS. "If you were called upon by Stone & Webster, for the purpose of the sale of the entire concern, to put a value upon the concern, would you have put this value that you have stated here in schedule A?"

The CHAIRMAN. The question is identical with the one you ask him now, isn't it, unless I misunderstand it?

Mr. MATTHEWS. The witness said he didn't know what was meant by the word "concern," and there was a good deal of discussion as to what the word "concern" meant. I want to ask the witness whether he has adopted the same method of valuation in this case for the plant itself that he does in making valuations for Stone & Webster commonly.

The CHAIRMAN. Weren't there more questions on that?

Mr. MATTHEWS. Yes, sir. Here is one:

"If Stone & Webster said to you, Here, we own a plant, an electric plant, it produces us so much money, we want to sell out our interest, would you have made your valuation in accordance with the method that you employed here in schedule A?"

Mr. BROOKS. What is his answer?

Mr. MATTHEWS. The answer is the same as the others. There is discussion as to what was meant. I think the whole matter is in some doubt, not only as to the meaning of Mr. Brooks's question but as to the effect of the witness's answers.

The CHAIRMAN. Did you ever get an answer to that?

Mr. MATTHEWS. I don't think we got a categorical answer to that. No, sir, we did not.

The CHAIRMAN. What became of it anyway?

Mr. MATTHEWS. In answer to both questions the witness said he didn't understand what Mr. Brooks meant. That was the substance of his reply, that he didn't understand what Mr. Brooks

meant; whether he understood, for instance, that he was called on to value the stock and bonds or the business or simply the plant.

Mr. BROOKS. It doesn't say all that, but still that perhaps is what he meant. At any rate, the question was never answered. The holiday season was impending, and we stopped.

Mr. MATTHEWS. I think the questions and answers on pages 1777 and 1778 leave the whole thing in such a state of doubt that we are entitled to clear it up, at least for this simple question.

The CHAIRMAN. What is your simple question?

Mr. MATTHEWS. Whether he has followed in this case the same method of valuation for the electric light plant of the Holyoke Water Power Company that he does in valuations made by him for his employers.

Mr. BROOKS. I understood him to say this morning that he objected to having the private business of Stone & Webster gone into. Now this opens the whole subject; we claim we have got the right to go into the details of it.

Mr. MATTHEWS. In view of that suggestion, then, I will limit my question to the methods adopted or used by him in such valuations for Stone & Webster as he has testified to.

Mr. BROOKS. Well, what is the question now?

The CHAIRMAN. This is the way it strikes me. He was asked a question by Mr. Brooks somewhat like the one you are putting now. If an answer had been taken from the witness with reference to that, then you certainly could put that question.

Mr. MATTHEWS. I did not hear that.

The CHAIRMAN. I say, if he had answered either of those questions about which there was some dispute with reference to the word "concern," then you would have some evidence upon which to re-examine, but those questions and answers disappear, or at least the answer disappears; or, rather, he had made no answer. Now on re-examination can you pick up a question and put it to the witness because he was asked on cross-examination a question where he says, "I don't understand what that question means"? It goes for nothing, and therefore I do not see why you should re-examine. That may not be law, but it is logical; at least it seems so.

Mr. MATTHEWS. I would like, then, to ask your Honor whether this answer permits me to ask the question that I desire

to ask. In the further questioning after the second question that I have quoted, I find this answer:

"It would depend on what they asked me to value."

I should like to ask him for an explanation of that statement.

Mr. BROOKS. I would like to have the connection shown there.

Mr. MATTHEWS. I think perhaps the point of this whole episode is not very significant, but it may have a bearing. We could not perhaps go into this matter on direct examination, but I think it is competent for the other side to ask whether a witness has valued other properties in the same manner; and he was asked a question as to what his firm has done, or what he would do for them, confining it, of course, to his own personal knowledge; and he says, in the first place, that he does not understand the question, and then he says that the answer would depend upon what Stone & Webster asked him to value. Cannot I ask him what he meant by that statement?

The CHAIRMAN. I do not think so. I may be too close on this, but I think this witness has been examined very fully.

Mr. MATTHEWS. He wasn't examined on that line by us, because it was hardly open on direct.

The CHAIRMAN. I understand that; but he says, "I don't understand the question," and then he says, "It depends on what you want me to value." I think it is of no consequence.

Mr. MATTHEWS. We do not desire to prolong the re-direct examination. I think that is all.

Re-cross examination by Mr. BROOKS.

Q. Do you say that the Concord plant was built in December, 1897, or January, 1898? A. No, sir, I didn't intend to say so.

Q. When was it built, if it ever was built? A. It started early in the year 1898, I don't know what time.

Q. What time in the year 1898 was the Concord plant started? A. I think it was early in the spring.

Q. What time? A. I don't know what month; it was early in the year.

Q. The transformers and arc lights that you would have in your so-called modern or ideal plant had not been put on the

market, had they, and there had not been one sold, up to that time? A. There had not.

Q. You claim, don't you, that your ideal plant is a money saver? A. Yes, sir.

Q. How much would that increase the net income of the Holyoke Water Power Company's electrical plant, in your opinion, if it were installed now? A. I cannot say off-hand.

Q. About how much? A. Because there are a number of conditions come in.

Q. About how much? A. I don't—

Q. Would it increase it? A. If you didn't have to—

Q. Would it increase it? A. It would if you didn't have to pay fixed charges on the present plant. If you could throw that away it would.

Q. All right. Wipe out the present plant and install your ideal plant in its stead. How much would the net income of the Holyoke Water Power Company, in its electrical department, be increased per annum? A. I don't know exactly. I should think it would be increased in proportion.

Q. What? A. I say I don't know exactly, but I should think—

Q. About how much? A. I should think it would be increased in the way that the operating expenses of the new plant are less than the operating expenses of the old.

Q. About how much would the increase be in dollars per annum for net profit, if any? A. It would be an increase.

Q. I didn't ask you that. A. Without knowing just exactly how you propose—how many days you propose to operate this by steam and water—I cannot give it off-hand, except as you can draw your inference from the schedules.

Q. Well, what should you say? Wipe out this present plant and install your ideal plant—your modern plant—that you think is the most efficient and the best. A. That would also depend on what you paid for the water power. I cannot answer that off-hand.

Q. I am talking about your plant.

Mr. GREEN. I think the witness is entitled to have some question put to him that he can answer, when he calls attention to the difficulty.

Q. You say you cannot answer my question? A. Not with the data you give me, no, sir.

Q. Supposing you remodel this present plant, then, in just the way that, to your expert mind, would make it the most efficient. What would the result be in dollars, if any, upon the increase of the net income of the Holyoke Water Power Company in its electrical department? A. Do you mean operating by steam or by combined steam and water?

Q. Just as you would have it. A. I wouldn't have it at all.

Q. I thought you were going to install an additional scheme, or did in your mind. A. I understand my plant, and I don't understand how you want to run your old plant. That is what I am trying to get at.

Q. Say you wipe that out, and you put a new one in its stead that will coincide with your best ideas of a so-called modern or ideal practice?

The CHAIRMAN. Mr. Brooks, is this on re-cross examination open to you?

Mr. BROOKS. I don't know. I don't say whether it is or not, but if it is not, then I will simply say I forgot to ask it.

Mr. GREEN. I think the witness is entitled to have a statement of whether Mr. Brooks desires his comparison on a steam driven plant entirely or a comparison of a steam and water driven plant?

Mr. BROOKS. Very well; say no more about it. I will drop this line of inquiry and follow the Chairman's suggestion.

Q. When was the Boston Electric Light plant rebuilt or remodelled? In 1898?

Mr. MATTHEWS. Has that been opened up?

Mr. BROOKS. Certainly, it is opened up most assuredly by your re-direct, when you asked him whether or not they were the old plants that were running a certain system.

Mr. MATTHEWS. We do not object.

Q. Did they build an entirely new station in 1898? A. I think they did, yes, sir.

Q. They do their incandescent lighting on the alternating-current system, do they not? A. I think they do.

Q. And that was installed in 1898, wasn't it? A. I think so.

Q. And their power service is chiefly on the 500-volt direct-current system, isn't it? A. I think it is largely.

Q. And they do their arc lighting from direct-current arc dynamos, do they not? A. Very largely.

Q. And you will agree that the 3-system plants were in successful operation even in 1898, won't you? A. There were plants of that type in successful operation, yes.

Q. Where do you get your 62 days on page 22 of your schedule? You say at the top of page 22, "The cost to operate the remodelled plant by water 303 days per year, by steam 62 days per year, assuming, for the present, no value for the water power plant." Where do you get your 62 days? A. That was made up of three items. One was the half of the Sundays, which would be 26 days; and the holidays, which I think I figured at 7.

Q. That is right. Where do you get the rest? A. And the rest, I assumed from the testimony, would be about the average condition of things.

Q. From whose testimony? A. From my general opinion I formed from reading the previous testimony.

Q. You formed an opinion, from having read some testimony, that it would be about 62 days? A. A total, yes.

Q. Not about 62 days, but exactly 62 days, according to your schedule, page 22. A. I took 62 days, yes. That is what I assumed.

Q. You haven't any estimates based upon the supplement to the original offer? A. No, sir, I have not. I haven't seen that.

Q. What loss in belting and shafting, or either, did you determine existed at the present plant? A. I made no determination of that kind.

Q. And you made no test to discover? A. I did not.

Mr. BROOKS. I think that is all I care to ask.

Re-direct examination by Mr. GREEN.

Q. Will you explain to us how their power is generated at the Boston Electric Light Company, in a few words, and how it is sent out? A. I think all the power in the station that is generated is alternating current, and it is sent out as alternating current for the incandescent lights, and is sent out as 500 volts for the power service, and also as a direct-current for the arc service. The arc service, however, is maintained by means of motor gen-

erators, the motor part being driven by alternating current and the generator part generating a direct current; and part of the reason for that was that they had so much existing apparatus outside, especially in the way of motors owned by private consumers, that at the expense of changing all of those it was thought best to arrange it in this way.

Mr. BROOKS. I do not agree that all that answer is competent.

The CHAIRMAN. All right, we will consider it.

Q. You understand that? A. That was my understanding of the condition that existed.

Q. Whether or not all the power is obtained by direct connection of the armatures to the shaft of the engines? A. I understand all of the machines are direct-connected.

Q. The engines and dynamos and switchboard are all in one room? A. Yes, sir.

Mr. BROOKS. Is this his understanding or knowledge?

The CHAIRMAN. I do not know. He was examined about this.

Mr. BROOKS. I asked for his knowledge, not understanding. I don't suppose what he has been told is competent.

Q. I will ask him as to his knowledge. A. This is from my own knowledge.

The CHAIRMAN. Very well.

Q. Is there any shafting or belting at all in the whole plant there, unless it is a little belt on one of the exciters?

Mr. BROOKS. I object to that as argumentative and leading.

Mr. GREEN. Well, perhaps it is.

Q. Tell us what belting and shafting there is in there. A. I don't remember any belting or shafting except the ordinary shafting that goes between the dynamo and the engine on the direct-connected units.

Q. Where is the power taken from and where is it taken to, that comes from the armatures on the engine shaft? A. It is taken directly from the armatures, right to the switchboard.

Q. Just one general question. In regard to the power, from the switchboard where is it carried to and how? A. It is carried to the transformers; part of it goes out onto the line, and part of it goes in the transformers and goes to the motors.

Mr. GREEN. That is all.

By Mr. BROOKS.

Q. That is, they have to use the same three kinds of current in this Boston Electric Light Company that they do in Holyoke, getting it, however, in a somewhat different way? A. Pretty near that.

Mr. BROOKS. Well, that is so near that I won't ask anything further.

The CHAIRMAN. Have you got through with the witness?

Mr. GREEN. That is all.

Mr. MATTHEWS. I would like to inquire whether the witness is to produce the details of his modern plant.

Mr. BROOKS. If he will produce the original details we should be very glad to inspect them, but if he is going to get up a set of details running back from his conclusion to his starting point, and getting his starting point from his conclusion, we certainly object.

Mr. MATTHEWS. Supposing he does not do that. Suppose he reproduces his data without reference to his conclusion?

Mr. BROOKS. He cannot reproduce it.

Mr. MATTHEWS. Do you want him to reproduce it? He says he can.

Mr. BROOKS. I don't care anything about it. I haven't heard him say so.

Mr. MATTHEWS. Haven't you said so?

The WITNESS. I said I could, yes, sir.

Mr. MATTHEWS. Now we offer it. If the other side declines the offer, we will let it go. That is, we offer to ask the witness to re-make those details and produce them and send them to counsel.

Mr. BROOKS. I understood this question had been passed on.

Mr. MATTHEWS. I did not know how it was passed on. We make the offer. You can take it up or not, as you please.

Mr. BROOKS. I am not taking up anything.

Mr. MATTHEWS. You can take it under consideration. That is all.

WILLIAM M. MASON, *sworn*.

Direct examination by Mr. GREEN.

Q. What is your name? A. William M. Mason.

Q. Where do you reside, Mr. Mason? A. Winchester.

Q. Massachusetts? A. Yes, sir.

Q. And you are a member of the firm of Mead, Mason & Co.? A. Yes, sir.

Q. Having an office in the Tremont Building in this city? A. Yes, sir.

Q. What is your business, Mr. Mason? A. General contractors.

Q. And how long have you been engaged in that business?

A. Oh, the firm of Mead, Mason & Co., of which my father was the initial member, something over fifty years.

Q. How long have you been engaged in the general contracting business? A. Twenty-one years.

Q. Whether or not in that connection you have had occasion to figure in the erection of buildings, to figure quantities, brick work, excavating? A. Yes, sir.

Q. Lumber? A. That is our general work.

Q. Whether or not you have had experience in the erection of large buildings? A. I think so.

Q. Can you mention some? A. Of any kind, do you mean?

Q. Yes, or any work along this general line. A. The building of the East Boston High School, for the city of Boston, which was a building that cost a quarter of a million or more; and two years ago the West End School; and we built, three or four years ago, the large manufacturing plant of the Boston & Maine Railroad at Concord, N.H., their general repair shops and plant generally. We have just completed an electrical light plant for the Navy Yard, at Portsmouth, N.H.; and so I might go on.

Q. Whether or not, at the request of the City of Holyoke, you have figured the quantities of excavating, brick work, mate-

rials generally, in the gas and electric works in Holyoke? A. I have.

Q. (Showing plans to witness.) I will have you look at these to see whether these were the plans used by you, or duplicates of those. A. I should presume they are. They look like them. I should judge so.

Q. Those are the electric plans that you just looked at? A. Yes, sir.

Q. These are the Company's plans introduced in evidence. And, in the case of the gas works, I have here the Company's plans for the gas works. Will you examine those plans and see if those were the plans, or similar blue prints, that you used in making your computations? A. I think they are. They are a little more perfected than the ones I had, I should judge.

Q. That is, the colors are put in? A. Yes, sir.

Q. And whether or not you have prepared a schedule setting out the quantities in the gas works, in whole or in part? A. In part, yes, sir.

Q. What quantities did you not put into your estimates? A. Well, I was given tabulated estimates of Sawin's and Kirkpatrick's originally; and, in looking over those estimates, I re-estimated those wherein the quantities varied to any extent, eliminating those where they did not.

Q. So that in the case of the gas works your estimates of quantities are in those instances where there is any substantial difference between Kirkpatrick's and Sawin's? A. Yes; and then later on I saw tabulated estimates made by Ranger, and those differed somewhat, and I made some further estimates of quantities than I had originally made.

Q. Have you here the schedule of the quantities, thus described by you, of the gas works? A. Yes.

Mr. GREEN. I offer this in evidence.

(Estimate of quantities of gas plant by Mr. Mason introduced and marked "Exhibit 152, W. L. H.")

[EXHIBIT 152.]

ESTIMATE

OF

GAS WORKS, HOLYOKE, MASS.

William M. Mason, of Mead, Mason & Co., 520 Tremont Building, Boston, Mass.

OFFICE.

Excavating	83 yds.
Back filling	17 "
Concrete	49 "

GASOMETER NO. 1.

Excavating	3,535 yds.
Back filling	713 "
Brick	446,012
Lumber	13,467 ft.
Roof boards	7,067
Slate	50.48

GASOMETER NO. 2.

Excavating	3,244 yds.
Back filling	1,027 "
Brick work	635,568
Flaggers	706
Lumber	11,960
Roof boards	8,947
Slate	68 sq.

BRIDGE STREET GAS HOLDER, NO. 3.

Excavating	7,137 yds.
Back filling	1,431 "
Flaggers	1,261
Brick	1,052,000
Lumber	18,094
Roof boards	14,910
Slate	106.7 sq.

EXHAUST, CONDENSER, WASH, AND PURIFYING BUILDING.

Excavating	813 yds.
Back filling	131 "
Brick	239,856
Brick piers	30,936

Lumber	17,050 ft.
Sheathing	3,850 "
Roofing	7,312 "
Slate	61 sq.
Plank	3,394 ft.

BLACKSMITH SHOP.

Brick	19,824
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LIME ROOM, PIPE SHOP, AND STATION HOUSE METER BUILDINGS.

Excavating	715 yds.
Back filling	143 "
Flaggers	1,021 ft.
Brick	173,768
Brick pier	13,728
Brick paving	56 yds.
Lumber	10,445 ft.
Flooring	4,455 "
Roof boards	4,060 "
Slate	33.6 sq.

VALVE ROOM AND WATER GAS ROOM.

Excavating	247 yds.
Back filling	63 "
Brick	79,176 ft.
Flaggers	330

RETORT HOUSE, WATER GAS PLANT BUILDING, WATER GAS ENGINE-ROOM.

Excavating	890 yds.
Puddling	217 "
Back fill	590 "
Flaggers	1,470 ft.
Floor flaggers	2,345 "
Brick work in building	375,888 brick
Brick paving	26,592 "
Slating	100.80 sq.
Roof boards	839 ft.
Timber	1,100 "
Gravel roofing	671 ft.

10 AREAS IN RETORT ROOM.

Excavating	111 yds.
Back fill	40 "
Brick	19,104

ENGINE BED.

Excavating	6 yds.
Brick	4,104

FOUNDATION TO BOILERS.

Excavating	15 yds.
Flaggers	289 ft.
Brick	6,000

COAL SHED.

Excavating	661 yds.
Back filling	245 "
Flaggers	1,188 ft.
Brick	287,328
Timber	21,369 ft.
Plank	1,240 "
Roof boards	10,395 "
Clapboards	1,611 "
Shingles	3,436 "
Gravel roof	3,840 "
Concrete	5,720 "

STORE SHED.

Excavating	49 yds.
Back filling	37 "
Flaggers	277 "
Timber	6,080 ft.
Boards	6,137 "
Concrete	2,440 "
Shingles	2,796 "

TANK NO. 1.

Excavating	854 yds.
Back filling	480 "
Concrete	45 ft.
Brick	74,904

TANK NO. 2.

Excavating	338 yds.
Back filling	86 "
Concrete	41 "
Brick	23,448

TANK NO. 3.

Excavating	447 yds.
Back filling	223 "

Concrete	28 yds.
Brick	40,968
Planking	2,461 ft.

TANK NO. 4.

Excavating	835 yds.
Back filling	420 "
Brick	78,192
Plank	1,191 ft.
Concrete	35 yds.

TANK NO. 5.

Excavating	157 yds.
Back filling	119 "
Brick	11,784
Concrete	5 yds.

Q. Can you tell me generally, in those instances, where Mr. Kirkpatrick's and Mr. Sawin's quantities differed, with whose quantities yours, as a whole, more nearly agreed? A. I couldn't tell you.

Q. You couldn't tell that? A. No, sir. I have not charged my mind with the comparison at all.

Mr. GREEN. Well, I will get at that in a moment in another way. We have here something which, I think, might shorten it, if our friends on the other side will admit that, subject to correction. I will tell you what it is. We have here a tabulation which shows Sawin's, Kirkpatrick's, Ranger's, and Mr. Mason's quantities in parallel columns. It has been prepared by a young man in Mr. Matthews's office. We had intended Mr. Mason to go through with it and check it up. I understand he has not done so. But we should like, if we may, to introduce this in connection with his testimony, subject to correction.

Mr. BROOKS. We object to that method of procedure.

The CHAIRMAN. I don't think you can use it if it is objected to.

By the CHAIRMAN.

Q. Do I understand that you made actual measurements from the plans? A. Yes, sir.

Q. Independent of everybody else? A. Yes, sir.

By Mr. GREEN.

Q. That is, your quantities are figured entirely from the Water Power Company's plans? A. From these plans here, yes, sir.

Q. Whether or not in the case of the electric light plant, you have made a schedule? A. I have.

Q. And whose quantities did you deal with in the making up of this schedule? A. They are my own.

Q. Pardon me: did you estimate all the quantities in that case? A. All the quantities that appear here. No, there are some few quantities—there is a small passageway building connected to two others, and the difference was nothing to speak of. I did not go into it at all.

Q. Did you use Mr. Kirkpatrick's and Mr. Ranger's figures to compare with this? A. Mr. Sawin, Mr. Kirkpatrick, and Mr. Ranger.

The CHAIRMAN. Where they disagree.

The WITNESS. Where they disagree to any extent, I figured it.

Q. That is in the gas works? A. In both.

Q. It was Mr. Walther's figures, was it not, in the electric light plant? A. No, I think not. Well, I may be wrong as to the name. I will look up and see. I paid little regard to what they were. I thought they were the same in both instances.

Q. Did you have a volume of testimony there that had the estimates? A. I did have it, yes.

Q. Let me show you Volume I. In the electric light plant, is that the schedule of quantities that you used? A. I should think they were. I didn't follow from this book at all: I simply followed from tabulations, three separate ones which were given to me, like this.

The CHAIRMAN. Does he say now that in practice he disagreed on everything except a very few small items?

The WITNESS. I simply said this,—that I used what data was given me to form my opinion as to what quantities I should estimate, simply because they varied in their tabulations.

Q. Were those the quantities submitted to you? (Handing

documents to witness.) A. Yes, sir: they are marked "Sawin," both of them.

Mr. GREEN. I would like to have these marked for identification. They will be found to be just the same thing.

(The two documents above referred to were marked respectively "Identified, Gas, December 26, W. L. H.," and "Identified, Electric, December 26, W. L. H.")

Q. You got certain quantities, then,—put it this way,—certain quantities figured in the electric light plant? A. Yes, sir.

Q. (Showing paper to witness.) And whether or not that is a schedule of those quantities? A. Yes.

Mr. GREEN. I offer this.

The schedule was marked "Ex. 153, F. H. B.," the same being as follows:—

[EXHIBIT 153.]

ESTIMATE

OF

HOLYOKE ELECTRIC LIGHT PLANT, HOLYOKE, MASS.

William M. Mason, of Mead, Mason & Co., 520 Tremont Building, Boston, Mass.

HEAD GATE.

Excavating	770 yds.
Back filling	520 "
Canal wall relaid	
Sheet piling	6,894
Hemlock timber	3,900 ft.
Hemlock plank	3,062 "
Rubble masonry	210 yds.

WHEEL PIT AND TAILRACE.

Excavating	21,968 yds.
Back filling	12,151 "
Brick	764,448
Foundation to Cabot Mill	255,448
Hemlock mud sills	62,875 ft.
Hemlock plank	80,000 "
Pine plank	29,600 "
Spruce sheet piling	2,728 "
4-in. sheet piling	

ESTIMATE OF ELECTRIC PLANT—W. M. MASON. 437

Canal wall taken down	342 yds.
Rubble masonry	2,068 "

WHEEL HOUSE.

Brick work	62,060
Pine roof plank	7,040

TUNNELS.

Excavation	615 yds.
Back filling	126 "
Flaggers	432 ft.
Concrete floor	624 "
Brick	89,472

IF TESTING FLUME IS NOT BUILT.

Excavation	364 yds.
Back filling	73 "
Brick	56,040

DYNAMO BUILDING.

Excavating	3,333 yds.
Back filling	904 "
Rubble masonry	417 "
Timber	31,255 ft.
Spruce plank	53,830 "
Native pine plank	23,829 "
Sheathing, Southern pine	3,090 "
Top flooring	21,700 "

STEAM ENGINE BUILDING.

Excavating	2,551 yds.
Back filling	340 "
Flaggers	2,117 ft.
Brick wall	217,104
Brick, engine bed	139,368
Timber	9,055 ft.
Pine plank roof	17,161 "
Top flooring	4,485 "

BOILER HOUSE.

Excavation	593 yds.
Back filling	58 "
Flaggers	1,713 ft.
Brick	185,144

Brick in bases	19,200
Pine roof plank	11,434 ft.
Lumber	1,433 "

CHIMNEY.

Excavating	319 yds.
Back filling	70 "
Brick	418,000

Mr. GREEN. Mr. Matthews and I have thought best not to go into the detail of this with the witness. We are going to offer a comparative table soon, which has all the various quantities side by side. So that we have nothing further to ask the witness at this point ourselves.

Mr. GOULDING. What do we understand this witness has testified to?

The CHAIRMAN. He has testified that he took and measured from the plans the quantities or dimensions of many of the things. He claims, as I understood him, that there were some things where your witnesses agree with the witnesses for the respondent.

Mr. GOULDING. Do I understand he has given any measurements? It might be important in connection with the cross examination to know whether he has testified to anything in connection with this case.

The CHAIRMAN. He has testified, I suppose, that these schedules are correct.

Mr. GOULDING. He has not even sworn that they are correct that I know of.

The CHAIRMAN. I thought he had.

Mr. GOULDING. They conform to his calculations.

Mr. GREEN. I will ask this general question. I thought it had been covered.

Q. Whether or not the quantities set out in your two schedules, one of the gas and one of the electric light plant, represent the true quantities called for in those buildings as represented by the plans? A. They were made by my own figures and my own computations.

Q. Whether or not, in your opinion, they represent the

true quantities called for as shown by the plans? A. As near as I can compute them.

Mr. GREEN. We should be very glad to take up any particular item that the Commission desired, but I was afraid we would simply get another mass of figures. A comparative schedule would show where the various witnesses stood.

Mr. BROOKS. Are you through with him?

Mr. GREEN. Yes.

Cross examination by Mr. BROOKS.

Q. Have you ever been in Holyoke? A. Sir?

Q. Have you ever been in Holyoke? A. Yes, sir.

Q. Visit these gas and electric light plants? A. I did.

Q. When? A. Two weeks ago.

Q. What? A. Something like two to three weeks ago.

Q. When were these estimates made up by you? A. They have been made within two or three weeks,—three weeks, I should say.

Q. You made your estimates before you visited Holyoke? A. In part, not wholly.

Q. What part didn't you make? A. Some portions of the excavations.

Q. What part of the excavations did you hold over? A. I could not tell you just now which parts. Some parts I could not get the general line of grade without a visit to the site.

Q. That is what I understand you to say,—that, as you understand it, you have taken your calculations from the plans that have been submitted in this case of the gas and electric light plants? A. Yes.

Q. Why did you go to Holyoke? A. I went there to—The plans were not in every instance perfectly plain, and I went there to look the ground over generally, to see and get a general idea.

Q. Did you make any measurements? A. At the—

Q. Gas works? A. Gas works? Not any to any extent.

Q. Did you make any? A. I think I did.

Q. Where? A. Well, I think I measured the distance on the dynamo building from the floor down—

Q. That is not gas. A. Oh, I beg pardon.

Q. I asked you gas works. A. I think I made a measurement from the present roadway —

Q. From the where? A. The level — the top.

Q. It is difficult to hear. A. I presume so. I cannot give you the number of the gasometer now without looking it up, but it was the one nearest the office. I measured as near as I could calculate from the top of the road or the driveway up to the top of the present soil as it is wharfed up around the gasometer. I also made measurements with regard to the grading around the gasometer in the rear of that. I should say, the one on the back side toward the river.

Q. What were you doing? Taking levels? A. I said I measured as near as I could —

Q. I did not understand whether that was taking levels or whether it was measuring. You said you measured from the top of the roadway to the gasometer? A. Oh, yes. It was to form as near an opinion as I could as to what the average depth of excavation would be.

Q. Did you use a level? A. I did not; no, sir.

Q. Are those the only measurements that you took at the gas works? A. I think those are the only ones I took; yes, sir.

Q. You made a memorandum of them? A. I think I did.

Q. Where is it? A. I think it is at the office.

Q. It is not here, anyway? A. No.

Q. What measurements did you get at the electric light works? A. Sir?

Q. What measurements at the electric light plant? A. I measured the distance from the top of the finish floor down to the road leading by the canal; and I think I did the same on the other end of the building, down on the lower side.

Q. Have you a memorandum of those measurements? A. I do not think so; no, sir.

Q. Did you make any memorandum of them? A. I think I did not; no, sir.

Q. You cannot tell me, with reference to any of the measurements that you made, what you discovered by your measurements? A. Well, I simply found —

Q. In feet? A. I found that so far as those measurements were concerned, that they compared with the elevations on the plans.

Q. I do not suppose you could tell me the measurements in feet that you made; if you cannot, I will scurry along. A. Well, I can by looking on the plan about what I — I said I found it compared with the plan as near as it could be measured.

Q. I understood you to say you took a memorandum of your measurements at the gas works? A. I think I did; yes, sir.

Q. That you will have here in the morning, maybe? A. I will try and find them; yes, sir.

Q. Did you ever construct any hydraulic plants? A. Plans?

Q. Plants. A. No, sir.

Q. Did you ever construct gas or electric lighting works? A. Buildings, simply.

Q. Gas works? A. Buildings; yes, sir.

Q. What gas works have you ever constructed? A. I built at Concord, N.H.

Q. What did you build there? A. I built the plant there, the gas plant.

Q. The entire gas plant? A. Well, at different times. There may be some buildings built by others.

Q. Did you ever build a gasometer? A. I do not think we have. Not to my recollection.

Q. But you have put up some building or buildings at Concord, N.H.? A. Yes.

Q. What buildings did you contract for the erection of in the gas works at Concord, N.H.? A. I cannot tell you what buildings.

Q. Did you ever plan gas works? A. Sir?

Q. Did you ever plan gas works? A. No, sir.

Q. Or electric light works? A. No, sir.

Q. Did you make any examination of the character of the soil at the gas works in Holyoke? A. No, sir.

Q. Or at the electric light works? A. No, sir.

Q. You do not know anything with reference to the original elevation there of the surface? A. I do not.

Q. In neither of these plants? A. I do not.

Q. So as to form any estimate of what excavation was necessary when these plants were first started? A. No, sir.

Q. You do not know how much grading was afterward performed? A. I do not know anything about it.

Q. You do not know anything about the original construction? A. I do not; no, sir.

Q. Have you made any estimate of the amount of water that would be handled in each instance in the gas works? A. The amount of water?

Q. Yes. A. No, sir, none whatever.

Q. Did you make any allowance for slope on account of the character of the soil? I think very likely you have answered that, because you stated you did not make any. Do not know anything about the soil? A. Well, I do not know anything about the soil; but I have based my quantities upon an average digging,—a good average digging soil.

Q. Do you mean to say by that you take an average slope for your excavations in both instances? A. I have allowed 6 inches to the foot slope.

Q. In each plant? A. I think so, in every instance. It may be not true, perhaps, in one or two; but I have intended to in every one of them.

Q. Does that mean 6 inches on each side? A. 6 inches to a foot; 6 inches horizontal to a foot vertical.

Q. And that is on each side? A. Yes.

Q. Well, that is what I am after. Is it 6 inches on each side or 3 inches on each side? A. Oh, 6 inches on each side.

Q. 6 inches on each side? A. Yes, sir.

Q. You allowed nothing for peculiarities of the soil or danger from water? A. I did not.

Q. Or any incidents that might be out of the ordinary?

A. No.

Q. In your estimate you do not go into the money value?

A. No, sir, I have only estimated quantities.

Q. And, as I understand you, you make these estimates from certain tabulations that were given to you by somebody?

A. No, I did not say that.

Q. Perhaps I am not making myself plain. As I understand it, certain tabulations of what was claimed to be Mr. Kirkpatrick's estimate, what was claimed to be Mr. Ranger's estimate, and what was claimed to be Mr. Sawin's estimates, were handed to you, and where you found there was a large difference or any considerable difference, then you put your mind to the task and came to your conclusions? A. That is what I did; yes, sir.

Q. Did you follow out the plans on the question of foundations for the gas plant? A. Did I follow what?

Q. Did you obtain the amount of your foundations in the gas plant from the plans? A. I think so; yes, sir.

Q. Are you certain about that? A. I will go through each one and see. I am quite sure. I do not know why I did not. I think so.

Q. What was the greatest depth of foundation for the gas plant that you took into consideration? For the buildings, of course,—you understand what I mean? A. Yes, sir, I understand. Well, that I cannot tell without looking over the plans to see.

Q. Will you look at the plans and tell me what is the greatest depth of foundation for any erection on the site of the gas plant that you took into consideration? A. Depth below what point?

Q. The greatest depth of foundation below the surface of the earth? A. In the gas plant?

Q. Yes, I am taking that as a — A. (After examining plan.) I think it is gasometer No. 1.

Q. In gasometer No. 1, what is the greatest depth of foundation? A. It scales here an average of about 20 feet to 20 feet 6 inches.

Q. What do you find to be the depth of foundations of the exhaust, condenser, wash, and purifying building? A. Which building do you say? Purifier?

Q. You have here on one page, I see, "Exhaust, condenser, wash, and purifying building"? A. Yes, sir.

Q. Your schedule is not numbered, so I cannot give you the page. A. That is marked on the plan. (Examining plan.) About 5 feet.

Q. 5 feet? A. Yes, sir.

Q. Did you find any of it that went down 15? A. I did not find any; no.

Q. Does either of your schedules give the depth of foundations for the buildings? A. Does the schedule?

Q. Yes. A. No, sir, it does not.

Mr. BROOKS. Inasmuch as we are to adjourn within a very few moments to go before Mr. Justice Morton, I do not know that I care to ask anything further to-night. I would simply ask the witness to bring in his detail calculations in the morning.

Mr. GREEN. Those are all here. He has those.

Mr. BROOKS. Oh, he has them here?

The CHAIRMAN. (To witness.) Perhaps you had better submit them if you have them here. I think it might facilitate—

The WITNESS. I will endeavor to give any data that they ask for, but I do not believe anybody could take another's figures and find what they related to. That is, one might take it one way and another another. It would be impossible for anybody to follow another's figures. I will give him the data.

(Adjourned to Thursday, Dec. 27, 1900, at 10 A.M.)

FIFTY-FOURTH HEARING.

BOSTON, Thursday, Dec. 27, 1900.

The Commission met at the Court House at 10 A.M.

WILLIAM M. MASON, *resumed.*

Cross examination by Mr. BROOKS, continued.

Q. Mr. Mason, you did not estimate as to prices at all, as I understand you? A. I did not.

Q. Did you figure with Mr. Kirkpatrick at all? A. Not to any extent. I did in two or three instances, I think, after my figures were made up.

Q. Did you figure with anybody else? A. No, not at all.

Q. In coming to a conclusion as to the amount of lumber used, what were your waste allowances, if any? A. Well, they varied in different instances, from an eighth — well, I think in the largest instance about a third.

Q. Have you your details of allowances for waste here? A. Yes, I think so.

Q. Will you let me see them? A. Yes, if you can follow them. I should have to follow them with you, probably.

Mr. MATTHEWS. You had better look them over with him, Mr. Brooks.

(The details were produced by the witness.)

Q. Cannot you have a list gotten up for us of the waste allowances? A. I can give it to you.

Mr. GREEN. Would it be much trouble for you to draw it off? Could you submit later a little schedule showing the waste allowance on the various buildings and parts of buildings?

The WITNESS. Certainly.

Mr. GREEN. We will furnish that to you.

Mr. BROOKS. I do not know that it will be of any consequence, but, if you will be kind enough to do that, I might desire to ask him a question hereafter upon it.

Mr. GREEN. Very well.

Q. How much sheet piling did you allow for the tailrace?

A. I didn't allow any beyond the sheet piling right around there.

Q. Where does the sheet piling for the tailrace show on your schedule that is submitted? A. It shows the amount of sheet piling which is 4 feet long and 19 feet long,—from recollection I give it,—and then there is added in the amount of 4 inch sheet piling, which does not show on the plan how far up it runs, and therefore I didn't estimate it.

Q. I see you estimate for sheet piling of the wheel pit and tailrace 2,728 feet? A. Yes, sir.

Q. Mr. Sawin's estimate is 22,987? A. Yes. I think the difference—at least, I judge the difference is that the 4 inch sheet piling was figured in the entire length on one side of the tailrace.

Q. You didn't figure in all the sheet piling that was used there, did you? A. I don't know.

Q. You can't tell anything about that? A. No. I figured what was shown on the plan.

Q. That does not show—the entire does not show—upon the plan? A. No, sir, it is broken off, it doesn't show there.

Q. So that would account, perhaps, for the difference between you and Mr. Sawin upon that subject? A. I think that is the difference; yes, sir.

Q. How long do you say you have been in the business of contractor and builder? A. Personally?

Q. Yes, sir. A. 20 years.

Q. You sublet, do you not, your excavation and matters of that kind? A. Only in instances.

Q. Usually? A. No, I think not usually.

Q. Have you any experience personally with excavation? A. Yes, sir, I have.

Q. Ever in plants such as this, except the one instance that you spoke of? A. Yes, sir, very many.

Q. I think I asked you yesterday and I understood you to say that you never had anything to do with but one gas plant?

A. Yes, sir.

Q. Was I correct? A. Yes, sir.

Q. And that in parts? A. Yes, sir; but I would like to explain, because my answer meant that in my experience with excavation—it is in the line of excavations for all buildings of this character or any character.

Q. The character of the soil makes a difference with the amount of slope you would use? A. Certainly.

Q. And it would of course vary with the ever-varying character of the soil? A. Very much.

Q. The only electric station that you have anything to do with, I think you said, was at Portsmouth? A. Oh, no. We built one over here at Malden, and one at Concord, N.H., and one or two for the West End Road, Boston.

Q. Central electric stations? A. For the West End Road?

Q. Yes. A. I think not central.

Q. Have you ever constructed any central electric stations? A. Yes, the one at Malden would be a central electric station.

Mr. MATTHEWS. You mean electric lighting?

Q. Yes, electric lighting. A. Yes, electric lighting stations.

Q. Did you ever construct a gasometer? A. I have not.

Q. In the gas works, for instance, I notice you take the purifying plant 5 feet down? A. Yes.

Q. For your foundation? A. Yes.

Q. And Mr. Walther, if I remember correctly, took it 15 feet down to rock bottom. A. I don't know. It is marked in instances here "to rock bottom."

Q. What? A. It is marked in the plan, in one place or two, "to rock bottom."

Q. Did you take it to rock bottom? A. I did not.

Mr. BROOKS. I think that is all I care to ask.

By Mr. GREEN.

Q. Why didn't you take it to rock bottom? A. Well, I didn't take to rock bottom for two reasons, one especially because I didn't know where rock bottom was; and the other instance, there were walls here that were shown in the footings only down to a certain depth, and they didn't carry any more weight than the other walls, and therefore I didn't see any reason why I should take those any more than the others.

Q. You took the footings of those walls that were shown?

A. Yes, sir.

Mr. GREEN. That is all.

Mr. MATTHEWS. You will furnish that schedule and send it to Mr. Green?

The WITNESS. Yes, sir, I will.

H. ROBERT BYGRAVE, *sworn*.

Direct examination by Mr. GREEN.

Q. What is your name? A. Hilary Robert Bygrave.

Q. You live in Boston, Mr. Bygrave? A. No: Belmont, Mass.

Q. You are an attorney-at-law? A. I am.

Q. You have an office with Matthews & Thompson? A. I do.

Q. Whether or not at the request of the City of Holyoke you have taken the quantities shown in Mr. Kirkpatrick's gas and electric schedules, and also Mr. Ranger's, Mr. Mason's, and Mr. Sawin's, and have arranged them side by side? A. I have.

Q. Take first the gas, which is marked "Identified" as of December 26, whether those are the figures, in connection with the total summary? A. Yes, they are.

Q. And whether or not the estimates as shown in the various schedules are truly set out there? A. They are.

Mr. GREEN. I desire to offer this comparative table of the gas quantities. It is the one used yesterday, marked for identification.

The CHAIRMAN. I hope you won't object to it.

Mr. BROOKS. No, I do not object to it. Is this going to be printed?

Mr. GREEN. Yes.

The CHAIRMAN. We do not need to examine it until it is printed, do we?

Mr. GREEN. No, sir, I think not.

Mr. BROOKS. We have made up a table also, last night; and we should like to take it and compare it.

The WITNESS. Perhaps I had better explain the separate sheet.

Mr. GREEN. Just a minute.

Mr. BROOKS. It is Kirkpatrick and Ranger alone, isn't it?

Mr. GREEN. No, Sawin, Kirkpatrick, Ranger, and Mason.

Q. From what source did you get Sawin's quantities? A. I got them from the estimates found in Volume I. of the testimony.

Q. And Kirkpatrick's, Ranger's, and Mason's? A. I took them from the schedules they submitted here.

Q. I see, in connection with the gas quantity schedule, that you have prepared a separate sheet which seems to refer to the totals. A. Yes: that is a summary of all the estimates of a certain number of principal items that are set down here, taken from that other schedule that I have prepared there. It shows the total amount for all the buildings of the gas and the electric plants.

Q. You made the computations yourself? A. I made the computations; yes, sir.

Q. Whether or not they are correctly made? A. I think they are.

Mr. GREEN. (To the stenographer.) Now, if you will mark those two.

(The "Comparison of Quantities in Gas Plant" was marked "Ex. 154, W. L. H.," and the "Summary of Quantities in Gas Plant" was marked "Ex. 155, W. L. H.")

Q. Whether or not in connection with the electric buildings you have also taken the quantities estimated by Mr. Sawin as shown in Volume I. of the evidence, and the quantities of Mr. Kirkpatrick, Mr. Ranger, and Mr. Mason as shown in their schedules, and arranged them side by side? A. I have.

Q. Whether or not that is your work that you have? A. It is.

Q. Whether or not it is correct? A. It is.

Mr. GREEN. I offer that.

(The "Comparison of Quantities in Electric Plant" was marked "Ex. 156, W. L. H.")

Q. Whether or not that is a summary prepared as the summary in the case of the gas buildings? A. It is.

Q. Whether or not the computations are made by you?
A. They are.

Q. And are correct? A. They are.

Mr. GREEN. I offer that.

(The "Summary of Quantities in Electric Plant" was marked "Ex. 157, W. L. H.")

Cross examination by Mr. BROOKS.

Q. Excuse me a minute, Mr. Bygrave. You got this up, of course, by request of counsel? A. I did.

Q. Did you make a comparison of the estimates of the others who testified in the case? A. I have only made a comparison of those gentlemen there,—Mr. Sawin, Mr. Kirkpatrick, Mr. Ranger, and Mr. Mason.

Q. You did not take Mr. Allen's or Dr. Robb's? A. No.

Q. Mr. Prichard's or any of the others? A. No.

Mr. BROOKS. That is all.

[EXHIBIT 154.]

GAS.

COMPARISON OF QUANTITIES IN HOLYOKE GAS WORKS.

OFFICE.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	81 cu. yds.	90 cu. yds.	90 cu. yds.	83 cu. yds.
Back filling	17½ " "	18 " "	18 " "	17 " "
Flaggers	166 sq. ft.	175 sq. ft.	175 sq. ft.	175 sq. ft.
Concrete	56 sq. yds.	47 sq. yds.	47 sq. yds.	49 sq. yds.
Brick work	39,150 brick	39,000 brick	39,000 brick	
Stone work:				
Granite door sills	2	\$44.72	\$52.00	
Brownstone steps	1			
" steps	2			
" window sills	8			
" window caps	8			
" door caps	2			
Slate hearthstone	2	2	2	
Lumber:	B.M.			
Spruce dimension timber	2,641 ft.	2,600 ft.	2,600 ft.	
Spruce lining floor	605 "	600 "	600 "	
Southern pine top floor	680 "	680 "	680 "	
White pine roof boards	1,020 "	1,000 "	1,000 "	
Narrow beaded whitewood sheathing	2,320 "	2,300 "	2,300 "	
Hardwood threshold	6			
Baseboards	116 lin. ft. of 10-in.	116 "	116 "	
Chair rail	100 " " 4-in.	100 "	100 "	
Picture mould	100 "	—	—	} Inside finish \$20.00
Labor	7,500 ft.	\$150.00	\$125.00	
Doors:				
Outside doors	2	2	2	
Inside doors	4	} 7	7	
" "	2			
" "	1			
Windows	8	8	8	
Window and door casings	442 lin. ft.			
Window and door stools and aprons	8			
Blinds	8	8	8	
Hardware	—	\$11.00	\$26.00	
2 Yale mortise catches				
7 common mortise catches				
3 Yale vim catches				
14 bronze iron door butts				
7 composition knobs				
8 brass lift plates				
8 brass safety catches				
8 sets brass hinges and latches for window blinds				
4 iron ventilators	—	4	4	
Fixtures:				
1 wash bowl	—	Plumbing	Plumbing	
1 Mott's "Decendo" tank closet,	—	\$67.50	\$75.00	
2 fireplaces and mantels	—	\$36.00	\$50.00	
2 radiators and necessary piping,				
Gas fixtures:				
1 two-light chandelier	—	Gas piping, etc.		
3 double wall brackets and necessary piping	—	\$41.50	\$40.00	
Painting, inside finish natural	—	\$63.00	\$60.00	
Drains, 25 ft. of 6-in. vitrified pipe,	—	\$12.50	\$12.50	
Slating, 8½ squares Bangor black slate	—	8.5 sq.	8½	

GASOMETER NO. 1.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	5,000 cu. yds.	3,500 cu. yds.	3,647 cu. yds.	3,535 cu. yds.
Back filling	2,000 " "	400 " "	630 " "	713 " "
Brick work	372,440 brick	440,000 brick	472,584 brick	446,012 brick
Stone work :				
Granite platform	5,000 sq. ft. 8 in. thick	} \$385.00	\$511.00	
Brownstone window sills	8			
Lumber	12,000 ft.	* 10,000 ft.	11,260 ft.	13,467 ft.
Labor on	18,000 "	\$175.00	\$150.00	
Windows	8	8	8	
Door	1	1	1	
Roof boards	6,000 in.	5,200 ft.	7,221 ft.	7,067 ft.
Slating	50 sq.	43 sq.	48½ sq.	50.48 sq.
Iron work :				
Cast iron	1,000 lbs.	} \$104.25	} \$18.75	
Wrought iron	4,150 "			
Cupola	—	\$78.00	\$75.00	
Southern pine	—	—	1,800 ft.	

GASOMETER NO. 2.

	Sawin.	Kirkpatrick.	Ranger.	Mason.	
Excavation	4,805 cu. yds.	2,800 cu. yds.	3,046 cu. yds.	3,244 cu. yds.	
Back filling	2,292 " "	600 " "	778 " "	1,027 " "	
Flaggers	622 sq. ft.	622 sq. ft.	693 sq. ft.	706 sq. ft.	
Brick work	634,756 brick	630,000 brick	622,888 brick	635,568 brick	
Stone work :					
Brownstone coping	277 sq. ft. of 6-in.	277 sq. ft.	277 sq. ft.		
" door sill	1	} Cut stone,	} Cut stone,		
" window sills	23			\$21.00	\$31.00
" door cap	1				
Lumber :					
Dimension lumber	13,959 ft.	*12,000 ft.	11,398 ft.	11,960 ft.	
White pine roof board	8,120 "	7,700 "	10,780 "	8,947 "	
Labor on	22,079 "	\$300.00	\$250.00		
Doors	1	1	1		
Windows	8 lbs.	} 23 lbs.	} 23 lbs.		
In cupola	8 lbs.				
Finial	1				
Hardware	—	\$24.00	\$25.00		
Slate	66,780 slate	65½ sq.	78.4 sq.	68 sq.	
Iron work	55,831 lbs. cast iron	\$45.00	\$45.00		
Chains	12				
Weights	12				
Bolts	1,707 lbs.				
Truss ties	6				
Cupola	—	\$117.00	\$75.00		

* Spruce timber.

EXHAUST, CONDENSING, WASH, AND PURIFYING ROOMS.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	76½ cu. yds.	700 cu. yds.	906 cu. yds.	813 cu. yds.
Back filling	1,591½ " "	135 " "	55 " "	131 " "
Brick work	353,262 brick	275,000 brick	290,392 brick	239,856 brick
Flaggers	16 sq. ft.	—	—	Piers, 30,936 "
Stone work :				16 sq. ft.
Brownstone door sills	7	} Cut stone, \$122.50	\$159.20	\$159.20
" door caps	3			
" window caps	32			
" window sills	26			
Granite door sills	2			
Granite doorsteps	5			
Lumber :				
Spruce dimension timber	16,595 ft.	18,600 ft.	18,549 ft.	17,050 ft.
Plank	6,361 "	2,000 "	2,006 "	3,394 "
Sheathing	4,255 "	4,500 "	3,840 "	3,850 "
Roof boards	6,811 "	7,200 "	7,100 "	7,312 "
Labor on	33,912 "	\$300 labor & nails	\$275.00	
Doors	7	7	} \$188.15	61 sq.
Windows	21	26		
Slatting	58 sq.	57½ sq.	56½ sq.	
Hardware	—	\$12.00	\$15.00	
Painting	—	\$26.00	\$35.00	
Iron work :				
Tie rods	2	} \$15.00	\$15.00	
Wrought iron	10,060 lbs.			
Cast iron	792 "			
Iron work	300 "			
Fixtures :				
Bath-tub	1			
Water closet	2			
Sink	1			
Drainpipe	80 lin. ft. of 6-in.			

PASSAGEWAY.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	11 cu. yds.	11 cu. yds.	13 cu. yds.	
Back filling	7½ " "	8 " "	9 " "	
Brick work	13,770 brick	12,500 brick	14,593 brick	
Stone work:				
Granite door sills	2	} Cut stone, \$15.75	\$22.50	
Brownstone door caps	2			
" window sills	2			
" window caps	2			
Lumber:				
Spruce dimension timber	420 ft.	420 ft.	377 ft.	
Plank	515 "	515 "	264 "	
Doors	2	2	2	
Windows	2	2	2	
Tar and gravel roof	197 sq. ft.	200 sq. ft.	180 sq. ft.	
Painting	—	\$3.80	\$5.00	
Hardware	—	\$3.20	\$4.00	
Labor and nails	—	\$30.00	\$20.00	
Roof boards	—	—	225 ft.	

BLACKSMITH SHOP.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	16 cu. yds.	16 cu. yds.	24 cu. yds.	16 cu. yds.
Back filling	10½ " "	10 " "	14 " "	10 " "
Brick work	17,832 brick	21,000 brick	19,436 brick	19,824 brick
Stone work:				
Granite door sill	1	} \$18.92	\$21.65	\$21.65
Brownstone window sills	4			
Brownstone window caps	5			
Lumber:				
Spruce dimension timber	489 ft.	500 ft.	414 ft.	
Roof boards	586 "	600 "	639 "	
Labor on	1,075 "	\$25.00	\$20.00	
Doors	1	1	1	
Windows	4	4	4	
Roof	488 sq. ft.	488 sq. ft.	511 sq. ft.	
Fixtures:				
Wood bench	1			
Brick forge	1			
Anvil	1			
Pipe rack	1			
Hardware	—	\$2.20	\$5.00	
Painting	—	\$3.36	\$4.00	
Flaggers	—	—	150 cu. yds.	174 ft.

PIPE SHOP, STATION AND HOUSE METER, AND LIME ROOMS.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	182½ cu. yds.	657 cu. yds.	542 cu. yds.	715 cu. yds.
Back filling	621 " "	192 " "	104 " "	143 " "
Brick work	228,840 brick	173,000 brick	181,372 brick	173,768 brick
Brick paving	56½ sq. yds.	56½ sq. yds.	2,116	56 yds.
Flaggers	231 sq. ft.	—	665 sq. ft.	1,021 sq. ft.
Stone work:				
Brownstone steps	3	} \$105.00	\$150.00	
" caps	10			
" sills	8			
" copings	2			
" window sills	11			
" window caps	12			
" door caps	3			
Granite steps	6			
" door sills	3			
Lumber:				
Spruce dimension timber	10,548 ft.	19,000 ft.	8,519 ft.	10,445 ft.
Roof boards	3,864 "	—	—	4,060 "
Floor plank	4,749 "	1,530 ft.	4,415 ft.	4,455 "
Labor on	20,343 "	\$225.00	\$220.00	
Doors	6	6	6	
Windows	19	19	19	
Slatting	32.16 sq.	31½ sq.	32½ sq.	33.6 sq.
Sheathing	1,182 ft.	1,200 ft.	1,215 ft.	
Painting	—	\$20.80	\$30.00	
Hardware	—	\$12.00	\$12.00	

VALVE AND WATER GAS METER ROOM.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	17½ cu. yds.	356 cu. yds.	247 cu. yds.	247 cu. yds.
Back filling	142 " "	13 " "	62 " "	63 " "
Brick work	92,616 brick	74,000 brick	75,584 brick	79,176 brick
Flaggers	87½ sq. ft.	88 sq. ft.	325 sq. ft.	330 sq. ft.
Stone work:				
Granite door sill	1	} \$54.09	\$54.40	\$54.40
Brownstone door sill	1			
" doorsteps	2			
" door caps	2			
" window sills	9			
" window caps	8			
Lumber:				
Spruce dimension timber	312 ft.	310 ft.	2,049 ft.	
Southern pine timber	1,816 "	1,800 "	818 "	
Floor plank	5,263 "	5,300 "	4,380 "	
Maple top floor	1,049 "	1,050 "	1,092 "	
Labor on	8,440 "	\$90.00	\$85.00	
Doors	2	2	2	
Windows	9	9	9	
Sheathing	134 ft.	\$24.50	\$20.00	
Iron	29 lbs.	—	60c.	
Slatting	51½ sq.	5½ sq.	5.6 sq.	
Fixtures:				
Copper bath-tub	1			
Radiator	1			
Plumbing and piping				
Gravel roof	—	150 ft.	106 ft.	
Painting	—	\$8.40	\$8.00	
Hardware	—	\$9.00	\$10.00	

RETORT HOUSE.

	Sawin.	Kirkpatrick.	Ranger.	* Mason.
Excavation	725 cu. yds.	513 cu. yds.	448 cu. yds.	890 cu. yds.
Puddling	105 " "	85 " "	104 " "	217 " "
Back filling	153½ " "	45 " "	112 " "	590 " "
Flaggers	1,142 sq. ft.	1,134 sq. ft.	612 sq. ft.	1,470 sq. ft.
Floor flaggers	2,282 " "	1,080 " "	2,050 " "	2,345 " "
Brick work	203,088 brick	203,000 brick	194,520 brick	375,888 brick
Stone work :				
Granite door sills	5	—	} \$176.21	\$176.21
Brownstone door caps	5	} \$137.31		
" window sills	10			
" window caps	16			
Iron work :				
Trusses	36,788 lbs.	} \$930.00	\$1,240.00	
Wall boxes	2,340 "			
Wrought iron (chimney support)	2,859 "			
" " (shutter blinds)	3,776 "			
Doors	5	5	5	100.80
Windows	16	16	16	
Slate	53 sq.	53 sq.	56½ sq.	
Painting	—	\$10.40	\$15.00	
Hardware	—	\$4.20	\$16.00	
Labor and nails	—	\$25.00	\$50.00	

* Mason has lumped his Retort House, Water Gas Plant Building, and Engine-room estimates together, and has put in the following:—

10 Areas in Retort Room.

Excavating	111 yds.
Back filling	40 "
Brick	19,164

Engine Bed.

Excavating	6 yds.
Brick	4,104

Foundation to Boilers.

Excavating	15 yds.
Flaggers	289 ft.
Brick	6,000

WATER GAS PLANT BUILDING.

	Sawin.	Kirkpatrick.	Ranger.	* Mason.	
Excavation	255½ cu. yds.	180 cu. yds.	224 cu. yds.		
Puddling	100½ " "	100 " "	112 " "		
Back filling	91 " "	60 " "	79 " "		
Flaggers	489 sq. ft.	483 sq. ft.	574 sq. ft.		
Concrete	20½ cu. yds.				
Brick work	126,624 brick	126,000 brick	143,016 brick		
Stone work:					
Granite door sills	3	}	\$164.64	\$173.80	26,592 brick
" " caps					
Brownstone door caps	3				
" window sills	21				
" window caps	21				
Brick paving	314 sq. yds.	22,000 brick	16,768 brick		
Iron work:					
Wrought iron	5,993 lbs.	}	\$446.20	\$460.00	
Cast iron	14,568 "				
Railing	150 ft.				
Trusses	23,609 lbs.				
Doors	4	4	4		
Windows	21	21	21		
Slating	39 sq.	39 sq.	41½ sq.		
Painting	—	\$21.00	\$30.00		
Hardware	—	\$18.40	\$20.00		
Fixtures					
Labor and nails	—	\$30.00	\$50.00		

WATER GAS ENGINE-ROOM.

	Sawin.	Kirkpatrick.	Ranger.	* Mason.
Excavation	74½ cu. yds.	30 cu. yds.	150 cu. yds.	
Puddling	32½ " "	—	19 " "	
Back filling	31½ " "	10 cu. yds.	21 " "	
Flaggers	172 sq. ft.	170 sq. ft.	18 sq. ft.	
Brick work	33,600 brick	33,600 brick	27,436 brick	
Stone work:				
Granite engine bed	1	\$72.13	\$75.00	1,100 ft. 839 "
" door sill	1			
Brownstone cap	1			
" window sills	6			
" window caps	6			
Brick pavement	57½ sq. yds.	4,100 brick	4,320 brick	
Lumber:				
Spruce dimension timber	924 ft.	1,000 ft. So. pine	748 ft. So. pine	
Roof boards	774 "	800 " " "	853 " " "	
Labor on	1,698 "			
Doors	1	1	1	
Windows	6	6	6	
Roof	645 sq. ft.	645 sq. ft.	682 sq. ft.	671 sq. ft.
Fixtures	1 radiator			
Painting	—	\$8.40	\$7.00	
Hardware	—	\$7.36	\$8.00	
Labor and nails	—	\$22.00	\$22.00	

* See note on previous page.

COAL SHED.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	747 cu. yds.	500 cu. yds.	285 cu. yds.	661 cu. yds.
Back filling	223 " "	100 " "	118 " "	245 " "
Puddling	185 " "	—	—	175 " "
Flaggers	1,189 sq. ft.	1,120 sq. ft.	1,130 sq. ft.	1,188 sq. ft.
Concrete	685 sq. yds.	—	—	5,720 sq. yds.
Brick work	285,024 brick	269,000 brick	259,856 brick	287,328 brick
Stone work :				
Brownstone sills	4	} \$9.84	—	\$14.00
" caps	4			
Lumber :				
Spruce dimension timber . . .	21,158 ft.	23,500 ft.	17,631 ft.	21,369 ft.
" roof boards	11,825 "	11,800 "	11,456 "	10,395 "
" plank	1,318 "	1,300 "	1,300 "	1,240 "
Labor on	34,301 "			
Doors	2	2	2	
Windows	7	7	7	
Moulds	130 lin. ft.	} \$58.47	} \$45.00	
Face boards	138 ft.			
Clapboards	1,803 sq. ft.	Exterior wood	2,130 sq. ft.	1,611 sq. ft.
Shingles	3,403 " "	\$140.80	35 " "	3,436 " "
Roof	3,413 " "	4,080 sq. ft.	4,018 " "	3,840 " "
Wrought iron	805 lbs.	\$10.00	\$10.00	
Painting	—	\$20.80	\$40.00	
Labor and nails	—	\$350.00	\$350.00	

STORE SHED.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	44½ cu. yds.	45 cu. yds.	45 cu. yds.	49 cu. yds.
Back filling	37 " "	—	—	37 " "
Flaggers	400 sq. ft.	240 sq. ft.	240 sq. ft.	277 sq. ft.
Concrete	280 sq. yds.	200 sq. yds.	200 sq. yds.	2,440 sq. yds.
Lumber :				
Spruce timber	6,363 ft.	5,600 ft.	5,600 ft.	6,080 ft.
Hemlock boards	5,203 "	3,000 "	3,000 "	} 6,137 "
Spruce boards	1,254 "	1,000 "	1,000 "	
Labor on	12,820 "	\$100.00	\$100.00	
Shingles	2,772 sq. ft.	\$46.00	\$102.00	2,796 sq. ft.

TANKS.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	3,470 cu. yds.	1,704 cu. yds.	2,205 cu. yds.	2,631 cu. yds.
Puddling	1,202 " "	75 " "		
Back filling	1,109 " "	562 " "	1,054 " "	1,328 " "
Concrete	151½ " "	153 " "	127 " "	154 " "
Brick work	220,872 brick	224,000 brick	238,324 brick	229,296 brick
Flaggers	64 sq. ft.	—	100 sq. ft.	
Iron	250 lbs.	\$4.50	\$5.00	
Plank	3,240 ft.	4,250 ft.	4,881 ft.	4,055 ft.
Tanks 6, 7, 8:				
Iron	2,300 lbs.	—	—	\$48.00
Centres	—	—	—	

BRIDGE STREET GASOMETER.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	10,249 cu. yds.	6,265 cu. yds.	6,129 cu. yds.	7,137 cu. yds.
Back filling	4,382 " "	3,380 " "	863 " "	1,431 " "
Flaggers	1,260 sq. ft.	960 sq. ft.	1,071 sq. ft.	1,261 sq. ft.
Brick work	1,049,530 brick	988,000 brick	969,042 brick	1,052,000 brick
Stone work:				
Brownstone coping	204 cu. ft.	} \$430.00	—	\$508.00
Granite pier caps	35.5 " "			
" door sills	9.32 " "			
Brownstone caps and sills	46.78 " "			
Lumber:				
Southern pine timber	1,620 ft.	1,620 ft.	2,950 ft.	} 18,094 ft.
Northern pine timber	23,705 " "	22,400 " "	15,134 " "	
" " finishing lumber	783 " "	800 " "	800 " "	
Roof boards	15,637 " "	15,600 " "	14,886 " "	} 14,910 "
Chestnut plank	4,880 " "	5,000 " "	5,432 " "	
Labor on	51,000 " "	\$450.00	\$400.00	
Fence:				
Posts and plank	3,064 " "	} 538 ft.	583 ft.	538 ft.
Pine	4,410 " "			
Slate	111 sq.	108 sq.	107½ sq.	} 106.7 sq.
Wire screen	485 sq. ft.	35 window screens	35 window screens	
Windows	35	35	35	
Doors	2	2	2	
Iron work:				
Girders, etc.	17,732 lbs.			
Weights, etc.	151,500 " "			
Chains	272 lin. ft.			
Bolts and rods	9,052 lbs.			
Railroad iron	4,320 " "			
Painting	—	\$63.00	\$54.00	
Pipe	155 lin. ft.			
Hardware	—	\$26.64	\$40.00	

[EXHIBIT 155.]

TOTAL QUANTITIES IN HOLYOKE GAS WORKS.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	25,764½ cu. yds.	17,367 cu. yds.	18,001 cu. yds.	20,110 cu. yds.
Back filling	12,708½ " "	5,533 " "	3,917 " "	5,837 " "
Puddling	1,624½ " "	260 " "	235 " "	
Flaggers	5,838 sq. ft.	4,992 sq. ft.	5,603 sq. ft.	6,444 sq. ft.
Brick work	3,671,404 brick	3,508,100 brick	3,548,043 brick	*3,636,150 brick
Concrete	1,192½ sq. yds.	400 sq. yds.	327 sq. yds.	8,363 ft.
Brick paving	428 " "	{ 56½ yds., 26,100 brick	23,204 brick	{ 56 yds., 26,592 brick
Lumber	209,662 ft.	197,025 ft.	143,091 ft.	
Slate	424.29 sq.	411.25 sq.	386.22 sq.	434.96 sq.
Floor flaggers	2,282 sq. ft.	1,080 sq. ft.	2,050 sq. ft.	2,345 sq. ft.

* Approximated.

NOTE.— Mason has put in no figures on the passageway.

[EXHIBIT 156.]

ELECTRIC.

COMPARISON OF QUANTITIES IN ESTIMATES OF HOLYOKE ELECTRIC
LIGHT STATION.

HEAD GATE.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	1,085 cu. yds.	1,000 cu. yds.	998 cu. yds.	770 cu. yds.
Canal wall taken down	262 " "	230 " "	223 " "	264 " "
Gravel puddling	207 " "	140 " "	135 " "	None
Back filling	744 " "	300 " "	315 " "	520 cu. yds.
Canal wall relaid	71 " "	70 " "	75 " "	} 210 " "
Rubble masonry	154 " "	154 " "	146 " "	
Brick work	4,977 brick	5,000 brick	5,120 brick	
Lumber:				
Hemlock sheet piling	8,703 ft.	8,300 ft.	8,330 ft.	6,894 ft.
" timber	3,907 "	3,900 "	3,900 "	3,900 "
" plank	3,291 "	—	3,029 "	3,062 "
White pine plank	1,094 "	1,100 ft.	1,056 "	1,100 "
Southern pine timber	4,560 "	4,600 "	4,600 "	
Wood gates	1,953 "			
Iron rack				
Iron work:				
Iron rods	6			
" penstocks	2			
" rings	4			
Vent pipes	2			
Labor and spikes	—	\$350.00	\$500.00	
Wood fender	—	—	\$48.00	

WHEELPIT AND TAIL-RACE.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	32,333 cu. yds.	23,600 cu. yds.	22,885 cu. yds.	21,968 cu. yds.
Canal wall taken down	343 " "	340 " "	320 " "	342 " "
Gravel puddling	1,258 " "	1,200 " "	1,204 " "	
Stone filling	50 " "	50 " "	48 " "	
Back filling	18,389 " "	14,600 " "	15,242 " "	*12,151 " "
Canal wall relaid	105 " "	105 " "	178 " "	} 2,068 " "
Rubble masonry	1,934 " "	2,073 " "	1,893 " "	
Cut granite masonry	7.5 " "	7.5 " "	8 " "	
Brick work	1,025,535 brick	801,300 brick	804,936 brick	} 764,448 brick Piers, 255,448 "
Lumber:				
Hemlock timber	61,075 ft.	61,000 ft.	62,267 ft.	62,875 ft.
" plank	96,720 "	87,000 "	86,486 "	80,000 "
Southern pine plank	36,017 "	30,000 "	31,656 "	29,600 "
Spruce sheet piling	22,987 "	5,600 "	2,932 "	2,728 ft. 4-in.
Labor on	216,800 "			
Wood centres	—	\$150.00		
Labor and spikes	—	\$1,000.00	\$1,000.00	
Wood arches	—	—	—	\$155.00
Coffer-dam	—	—	—	\$260.00

* Back fill, if Cabot Mill piers go in, 394 yds. less.

WHEEL-HOUSE.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Brick work	65,596 brick	64,000 brick	62,096 brick	62,064 brick
Granite door sills (13)	26.39 cu. ft.	Cut stone, \$50.60	\$55.00	
Lumber:				
Southern pine timber	8,331 ft.	8,300 ft.	6,228 ft.	
" " plank	3,208 "	3,200 "	3,924 "	
Roof plank	3,977 "	7,500 "	6,748 "	7,040 ft.
Labor on	15,500 "	\$175.00	\$170.00	
Doors	2	2	2	
Windows	11	5	11	
Gravel roofing	2,065 sq. ft.	2,100 sq. ft.	2,045 sq. ft.	
Zinc flashing	182 " "			
Iron work:				
Wall plates	244 lbs.	\$12.00	\$8.50	
Bolts	224 "		\$5.04	
Pipe railing	243 lin. ft.			
Steam pipe	183 " "	Hardware, \$10.20		
Condenser	1			
Valves	2			
Gas pipe	87 ft. 5 in.		—	\$15.00
Gas burners	3	\$9.00		
Whitewashing	1,628 sq. ft.		\$25.00	

TUNNELS.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	584 cu. yds.	385 cu. yds.	575 cu. yds.	615 cu. yds.
Back filling	526 " "	104 " "	183 " "	126 " "
Flaggers	597 sq. ft.	597 sq. ft.	342 sq. ft.	432 sq. ft.
Brick work	86,265 brick	59,700 brick	62,750 brick	89,472 brick
Concrete	655.5 sq. ft.	75 sq. ft.	70 sq. ft.	624 sq. ft.
Southern pine timber	107 ft.	100 ft.	84 ft.	
Iron work:				
Cast iron	3,438 lbs.			
Bolts	476 "			
Steam pipe	140 ft. 3-in.			
Valve	1			
Wood centres	—	\$10.00	\$12.00	

MASON.

If flume was not built:

Excavation	364 cu. yds.
Back fill	73 " "
Brick	56,040 "

DYNAMO BUILDING.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	5,041 cu. yds.	2,900 cu. yds.	2,900 cu. yds.	3,333 cu. yds.
Back filling	1,692 " "	1,273 " "	772 " "	904 " "
Flaggers	3,908 sq. ft.	3,900 sq. ft.	3,538 sq. ft.	3,668 sq. ft.
Concrete	5,288 " "	587 sq. yds.	582 sq. yds.	5,038 " "
Brick work	633,013 brick	633,000 brick	621,674 brick	632,312 brick
Red mortar	13,355 sq. ft.			
Rubble masonry	432 cu. yds.	432 cu. yds.	394 cu. yds.	417 yds.
Cut stone:				
Pier caps	75			
Granite sills	165 cu. ft.	} \$344.10	\$370	\$370
Lumber:				
Southern pine timbers	40,211 ft.	31,000 ft.	31,030 ft.	31,255 ft.
Floor plank	58,944 "	57,978 "	52,136 "	53,830 "
Roof plank (Northern pine)	27,995 "	27,562 "	24,740 "	23,829 "
Southern pine sheathing	2,658 "			
Northern " "	10,112 "	} 4,000 "	{ 3,000 "	3,090 "
Top floor	18,946 "	16,700 "	21,580 "	21,700 "
Platforms	3	3	3	
Labor on	158,866 ft.	\$1,000.00	\$1,000.00	
Windows	102	102	102	
Doors	17	17	17	
Iron work:				
Cast iron	35,710 lbs.			
Wrought iron	52,555 "	} \$2,115.00	\$2,115.00	\$2,115.00
Bolts	13,719 "			
Gravel roofing	7,465 sq. ft.	7,465 sq. ft.	7,497 sq. ft.	
Zinc flashing	837 " "			
Fixtures:				
Steam pipe	3,256 lin. ft.			
Valves	15			
Radiator	1			
Gas pipe	962 lin. ft.			
Burners	35			
Water pipe	275 lin. ft.			
Standpipe	46 " "			
Valves	8			
Fire hose	250 ft.			
Brass nozzles	5			
Soil pipes	148 lin. ft.			
Traps	5			
Leaders	154 lin. ft.			
Sinks	2			
Faucets	3			
Water-closet tank	1			
Water closet	3			
Wash bowl	1			
Urinal	1			
Elevator	1			
Traveller	1			
Whitewashing	3,770 sq. ft.	\$68.20	\$175.00	
Painting	—	—	\$150.00	
Plumbing	—	\$149.15	\$60.00	
Hardware	—	\$43.20		

STEAM-ENGINE BUILDING.

	Sawia.	Kirkpatrick.	Ranger.	Mason.
Excavation	2,424 cu. yds.	2,177 cu. yds.	1,822 cu. yds.	2,551 cu. yds.
Old stone wall taken down	184 " "			
Gravel puddling	216 " "	216 cu. yds.	84 cu. yds.	
Back filling	356 " "	300 " "	288 " "	340 cu. yds.
Flaggers	2,045 sq. ft.	1,700 sq. ft.	1,674 sq. ft.	2,117 sq. ft.
Brick work	366,058 brick	354,500 brick	384,401 brick	217,104 brick
Red mortar	7,653 sq. ft.			Beds, 139,368 "
Granite sills	41 cu. ft.			
" cylinder stones	380 " "	} \$1,110.42	\$1,194.00	
" bottom "	133 " "			
Lumber:				
Southern pine timber	11,481 ft.	9,608 ft.	9,402 ft.	9,055 ft.
Spruce plank	13,752 "	13,700 "	13,008 "	
Roof plank	18,436 "	18,400 "	15,348 "	17,161 "
Top floor	5,157 "	5,100 "	5,998 "	4,485 "
Southern pine finishing lumber	1,761 "	1,500 "	1,500 "	
Platform	1	\$10.80	\$15.00	
Labor on	50,587 ft.	\$375.00	\$375.00	
Windows	18	18	18	
Doors	4	4	4	
Iron work:				
Wall plates	6,765 lbs.	} \$665.00	\$665.00	
Bolts	4,085 "			
Roof trusses	16,400 "			
Slate	48 sq.	47½ sq.	46½ sq.	
Wire snow guards	1,716			
Zinc flashing	230 sq. ft.	—	\$9.00	
Gutter	39 ft. 6 in.	—	\$4.25	
Leaders	65 ft.	—	\$7.80	
Pipe railing	266 lin. ft.			
Burners	5			
Gas pipe	174 lin. ft.			
Steam pipe	290 " "			
Drip pipe	5 ft. 6 in.			
Valves	5			
Condensers	2			
Fire hose	100 ft.			
Brass nozzles	2			
Water pipe	387 lin. ft.			
Valves	4			
Hardware	—	\$23.08	\$24.30	
Painting	—	\$10.34	\$23.50	

BOILER HOUSE.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	742 cu. yds.	208 cu. yds.	176 cu. yds.	593 cu. yds.
Gravel puddling	147 " "	147 " "		
Back filling	145 " "	22 " "	22 cu. yds.	58 cu. yds.
Flaggers	1,718 sq. ft.	1,700 sq. ft.	1,082 sq. ft.	1,713 sq. ft.
Brick work	204,373 brick	190,900 brick	185,484 brick	{ 185,144 brick
Brick paving	19,300 "	\$106.56	11,038 "	{ 19,200 "
Red mortar	4,534 sq. ft.			{ 19,328 "
Cement coping	42 lin. ft.	42 lin. ft.	42 lin. ft.	
Granite sills	21 cu. ft.	cut stone \$42.78	\$46.00	
Lumber:				
Southern pine timber	1,277 ft.	1,300 ft.	1,349 ft.	
Northern pine roof plank	13,592 "	12,540 "	10,631 "	11,434 ft.
Pine finishing lumber	5,141 "	\$13.95	\$15.00	1,433 "
Clapboards	92 sq. ft.			
Iron work:				
Trusses	19,350 lbs.	\$575.00		
Bolts	153 "		\$575.00	\$575.00
Pipe railing	53 lin. ft.			
Smoke pipe	3,071 lbs.			
Hangers	210 "			
Gravel roofing	2,878 sq. ft.	2,850 sq. ft.	3,225 sq. ft.	
Doors	5	5	5	
Iron door-sills	2			
" side pieces	4			
" wall hinges	6			
Windows	26	26	26	
Labor on	20,000 ft.	\$190.00	\$190.00	
Water pipe	859 lin. ft.			
Valves	35			
Faucets	2			
Gas pipe	337 lin. ft.			
Burners	11			
Wrought-iron pipe	30 lin. ft.			
Globe valves	2			
Steam pipe	198 lin. ft.			
Ells	22			
Tees	15			
Gate valves	9			
Iron exhaust	12 ft. 6 in.			
Hood	1			
Sink	1			
Water closet	1			
Felt pipe covering	740.5 sq. ft.			
Painting	—	\$8.80	\$20.00	
Hardware	—	\$25.20	\$35.00	

CHIMNEY.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	1,261 cu. yds.	333 cu. yds.	333 cu. yds.	319 cu. yds.
Gravel puddling	135 " "	66 " "	66 " "	None
Back filling	945 " "	90 " "	207 " "	70 cu. yds.
Spruce piles	121	121	121	121
Flaggers	766 sq. ft.	766 sq. ft.	765 sq. ft.	766 sq. ft.
Stone work	168 cu. yds.	165 cu. yds.	168 cu. yds.	168 cu. yds.
Brick work	393,059 brick	387,000 brick	393,000 brick	418,000 brick
Iron ash-door and frame	500 lbs.	} \$147.50	\$149.00	
Ladder rungs	576 "			
Anchor bolts	85 "			
Iron cap	4,800 "			

[EXHIBIT 157.]

COMPARISON OF QUANTITIES IN HOLYOKE ELECTRIC LIGHT PLANT.

	Sawin.	Kirkpatrick.	Ranger.	Mason.
Excavation	43,470 cu. yds.	30,603 cu. yds.	29,689 cu. yds.	{ 3,049 cu. yds. 26,689 " "
Gravel puddling	1,963 " "	1,769 " "	1,489 " "	
Back filling	22,797 " "	16,689 " "	17,029 " "	{ 410 cu. yds. 13,442 " "
Flaggers	9,034 sq. ft.	8,663 sq. ft.	7,401 sq. ft.	8,696 sq. ft.
Brick work	2,778,876 brick	2,495,400 brick	2,519,461 brick	2,787,560 brick
Concrete	5,943.5 sq. ft.	662 sq. ft.	652 sq. ft.	5,662 ft.
Brick paving	19,300 brick	—	11,038 brick	19,328 brick
Lumber	485,393 ft.	419,988 ft.	414,962 ft.	

WILLIAM J. HOWES, *sworn.*

Direct examination by Mr. GREEN.

Q. What is your name? A. William J. Howes.

Q. You live in Holyoke, Mr. Howes? A. I do.

Q. What is your occupation? A. An architect.

Q. You are also a civil engineer? A. Not exactly; no, sir. I do not claim to be a civil engineer exactly.

Q. How long have you been in business in Holyoke as an architect? A. Since 1892.

Q. You were a resident of Holyoke before that time? A. Yes, sir.

Q. It is your native place, is it? A. Yes, sir; born there.

Q. Are you familiar with the poles and wires of the Holyoke Water Power Company used in their electric lighting? A. I am.

Q. And with the poles and wires of the street railway company? A. I am.

Q. And also of the telephone company? A. I am.

Q. Whether or not you have had any practical experience in the past in connection with tabulating the poles of the street railway company? A. I have,—not exactly tabulating, but noting them.

Q. Noting them? A. Noting them.

Q. Whether or not noting the condition or situation or what? A. No: location of wires and boxes, cut-outs, and all such things on the different poles throughout their whole system.

Q. As I understand, you are familiar, as you say, with the poles and wires of the Holyoke Water Power Company in its electrical distribution system? A. Yes, sir.

Q. Whether or not at my request you have during the past two weeks gone over the pole and wire lines, the feed and service wires of the Holyoke Water Power Company used in their electrical business? A. I have.

Q. And whether or not you have gone over all the streets in Holyoke or only a part? A. Only a portion.

Q. And is there any reason why you didn't go over the rest?

Mr. BROOKS. How is that competent?

Mr. GREEN. Simply as explanatory —

The CHAIRMAN. Well, if they don't want it, we don't want it.

Q. You have gone over certain streets. Have you tabulated the result of your work on those streets? A. I have.

Q. Without tabulating, whether or not you have examined the poles and wires on the remaining streets? A. I have.

Q. And you have tabulated certain streets? A. I have.

Q. Will you state in a general way what examination you made of the poles and wires, — that is, with what objects in view you examined them, first of all? A. I examined them to note the conditions of the poles and the wires, whether they were on the Water Power Company's poles or foreign poles or not.

Q. That is, along the streets that you go, whether or not there are poles other than the Water Power Company's poles?

A. There are.

Mr. BROOKS. Well, how can he tell?

Mr. GREEN. He has already testified —

Mr. BROOKS. I object to that, may it please your Honors. How can he pass on our title?

The CHAIRMAN. He has not done you any damage yet. Let us see what he knows about it.

Mr. BROOKS. We would like to save that question.

The CHAIRMAN. Seriously? You are not serious about that?

Mr. BROOKS. Yes. He asks him, as I understand it, whether there are wires strung on other poles than the Water Power Company's poles, assuming that it is the electric lighting wires.

The CHAIRMAN. Well, you have got to show, Mr. Green, that they belong to the Water Power Company: otherwise we cannot take the testimony.

Mr. GREEN. Well, this gentleman has testified that he is familiar with the poles and wires,—that is, the distribution system of the Holyoke Water Power Company, also of the street railway company,—and that he has in the past scheduled, as I would call it,—gone over and mapped out the pole and wire distribution system of the street railway company; that he is also familiar with the poles and wires of the telephone company—

The CHAIRMAN. Yes, he has said that.

Mr. GREEN. (To the stenographer.) Now what was the question?

The CHAIRMAN. I suppose any other man that stands on the street and knows the poles and wires, and knows where the wires run from, can describe what he has seen. As to whether he can determine the title of the property, that, of course, would be another question.

(The question, "That is, along the streets that you go, whether or not there are poles other than the Water Power Company's poles?" was read by the stenographer.)

Q. You say there are? A. Yes.

Q. As I understand, you have on certain streets tabulated the poles, and have the details before you, so as to show on what poles the wires run? A. I have.

Q. Are the poles that you have described as Holyoke Water Power Company's poles marked in any way? A. The arms on them have the "H. W. P. Co." on them; and they are, many of them, painted lead color.

Q. Well, wooden poles? A. Wooden poles; some iron.

Q. Now, taking any street as an illustration, will you explain to the Commission how the wire system runs on that street?

Mr. BROOKS. We object to it.

The CHAIRMAN. Oh, he can describe it, Mr. Brooks.

Mr. BROOKS. Well, of course your Honor sees it is sort of "whipping the devil around the stump," as we look at it: it is the purpose to put in title here with this question.

The CHAIRMAN. Well, there is no purpose of that kind,

so far as I can see. The witness has already stated there were certain signs on the posts. He is bringing to us a photograph of the street—I suppose it is practically the same as that.

Mr. GREEN. Yes, sir.

Mr. BROOKS. I would like to ask the other side a question here.

The CHAIRMAN. You can cross examine the witness if there is any trouble in your mind.

Mr. BROOKS. Do you claim here that any of the poles set out in our plans and tabulations are not the poles of the Water Power Company?

Mr. GREEN. We claim that we cannot find the poles, all of them, that you set out; but that is not the main object that we have in view. We claim that your wires are on the poles largely of other companies, and we claim that your poles are loaded to a large extent with the wires of other companies. We claim that these poles of the Holyoke Water Power Company have the wires of the street railway company upon them, and in some instances of the telephone company upon them. We claim that the wires of your company are carried for long distances, in some instances entirely upon poles of the telephone company and of the street railway company. We claim that the services of the Holyoke Water Power Company are almost entirely upon the poles of other companies. Now it cannot be that our friends desire to be over-technical about the question of whose poles these are. I do not believe that their own people who sit beside them will tell them other than that the poles of the Holyoke Water Power Company are distinguishably marked in the city of Holyoke, so that anybody who is familiar with the place, as Mr. Howes is, can tell them.

Mr. BROOKS. Some of them are, but not all, Mr. Howes himself says.

Mr. GREEN. Mr. Howes can describe the poles that he picks out as the poles of so and so, and we will identify title afterwards so far as he don't know that.

The CHAIRMAN. He may do that.

Mr. GREEN. That is all I ask him, to describe it; and I have answered my brother's question.

Mr. BROOKS. I am obliged to you. Is this coming in in the form of a table, Mr. Green? Are you going to give us a schedule?

Mr. GREEN. We have all the details of the work here which we desire to have marked and left here. We do not desire to have it printed, because it is very involved, and it would be very expensive to print it; but it may be left here as an exhibit in charge of the stenographer.

The CHAIRMAN. It is also, of course, to be placed in the hands of Mr. Brooks for examination?

Mr. GREEN. Of course, it will be in everybody's hands.

Q. Will you pick out some one street? A. Well, take High Street between Appleton and Division. Upon the north-west corner of Appleton Street is a Water Power Company's wooden pole, an octagonal pole. It has nine arms of the Water Power Company, and one street railway arm, and two transformers. On the north-east corner there is another octagonal pole, wooden pole. It has two arms of the Water Power Company and one pole light —

By the CHAIRMAN.

Q. What? A. Pole light, electric light. I make a distinction between the arm lights that run out into Suffolk Street and one that is directly on the pole. On the west side next is a street railway pole with two arms of the Water Power Company, and it is used for service wires of the Water Power Company; and on the east side there is another street railway pole, with two arms, and used as service. This carries the service wires over the street railway wires, trolley wires, and guard wires to the other side of the street, then down into the stores. Then on the west there is an octagonal wooden pole with four arms and one bracket of the Water Power Company's. On the west side there is a street railway pole with one arm, one bracket, and one porcelain insulator.

By Mr. GREEN.

Q. Now you can read all those things, can you, that you tell us out of your detail? A. I can; yes, sir.

Q. I would like to have you show to the Commission and to the counsel, if they desire to look over, the form in which you kept this. Go right back to the place where you were, and show what all these various markings mean. This is page 30? A. Page 30.

Q. Now explain what you have on the page, and each little mark, what it means. A. First I give the street, and then the headings are enumerated, as you see, "Poles." Under the head of "Poles," I give the companies which I assume own the poles, and the material the poles are made of, and the condition of the poles.

Q. That "Material" and "Condition" applies to whose poles? A. It applies to the Water Power Company's poles especially. Under those belonging to the Holyoke Water Power Company I designate with symbols. A diamond shape designates an octagonal pole. Where it is round, it designates either an iron or a round wooden pole. Where it is square, it designates a square wooden pole. The location of the symbol in the square gives the relative height. Those nearest the top show the shortest pole. The street railway I have designated by a check mark, showing they are street railway.

Q. Well, what is the significance of a check mark against the street railway? A. Showing it is a street railway pole that is being used.

Q. By whom? A. By the Water Power Company. The condition is marked "rusted" for iron poles, "eaten" and "rotted" for wooden poles.

Mr. BROOKS. What was that?

Mr. GOULDING. The symbol denotes whether they are rotten or rusted.

The CHAIRMAN. What symbol?

The WITNESS. I use a check mark for some of them, and give the figures for the depth that they are rotted or eaten.

Q. For instance, on this page 30? A. Between Division Street and Suffolk—

Q. Yes. A. —there is on the east side a pole that is one-third eaten.

Q. By "one-third eaten" you mean what? A. It is gnawed by the horses into it one-third the way.

By the CHAIRMAN.

Q. You have a good many "cribbing" horses up there?
A. Yes, sir.

By Mr. GREEN.

Q. Now what? A. Then under the next heading are the fixtures upon these poles. These are divided mainly into the arms and brackets. This is subdivided into those of the Water Power Company, the Holyoke Street Railway, and the New England Telephone Company, noting upon each pole the number of arms, brackets, and these porcelain insulators that are used to attach the wires as they come sometimes, whether they belong to the Water Power Company, or whether they are Holyoke Street Railway or New England Telephone on their respective poles, as noted before. The "Wires" is another heading under "Fixtures," and this is subdivided into the mains and service wires, this being used to show the Holyoke Water Power Company's wires on foreign poles,—by that I mean Holyoke Street Railway and New England Telephone, whether they are used for mains or for service. Then "Transformers" is another heading under fixtures. "Boxes" is another heading. Then the "Lights" is another heading, subdivided into the pole lights and the arm lights. Then there is another general heading of "Foreign Attachments."

By Mr. GOULDING.

Q. What? A. "Foreign Attachments," of which there are but very few, as I found,—span wires, guard wires, and guy wires of the street railway or New England Telephone Company upon Holyoke Water Power Company's poles. Then in "Remarks" I note whether these poles that are used by the Water Power Company are used for supports or guards or any

other information that I could not note in the tables, those two especially.

By Mr. GREEN.

Q. You have a table of condition, in which you have marked the condition of some poles, I note there, as "rotted," one-third rotted, or two-thirds rotted. Whether or not you have included all the poles that are rotted,—whether you have included in there all the poles that are rotted? A. No, not all.

Q. What poles have you? A. Those that I casually examined and minutely examined.

By Mr. BROOKS.

Q. And what? A. Minutely examined and casually examined. There were others that had the appearance of being rotted, yet the time was so short to do what I had to do that it was impossible to make even a casual examination of them.

By Mr. GREEN.

Q. Those are the ones. So far as the rotted ones are concerned, those are the ones that you examined? A. Yes, sir, they are noted.

Q. Can you tell us what streets you went over? It might be well to have that. A. I went over especially the streets upon which the Holyoke Street Railway lines run, Main Street from the South End clear around to the South Hadley Falls bridge, including a portion of Canal Street, Dwight Street, Appleton Street, Sargeant Street, Cabot Street, Hampden Street, Northampton Street, Essex Street, Maple Street; and there are a few others that are really laterals that run off from these that I went over, not taking in the whole system.

Q. That is, these streets that you are enumerating are those that you have enumerated in your schedule? A. Yes, sir.

Q. And some other lateral and side streets? A. Some lateral or side streets.

Q. Now, of the streets that you have been over and which are shown in your book, have you summarized in any way the results? A. I have. I made a recapitulation of all that are enumerated in this tabulation.

Q. Will you tell us the whole number of poles used by the Holyoke Water Power Company for the support of its wires in the district that you have described? A. 1,277.

Q. Do you refer to their own poles, or poles which you understand to be their own, or others in that number? A. The total number of poles enumerated in this tabulation, Water Power, street railway, New England Telephone, and one flag pole.

Q. How many of those poles, of the 1,277 that are used by the Holyoke Water Power Company, are really and only occupied by their wires? A. 977.

Q. And how many of the poles have wires of the Holyoke Street Railway upon them? A. 180.

Q. That is, the 180 have what kind of wires, guard or feed wires? A. 26 have guard wires, used for guard wires, and 136 used as supports, and 18 used as supports and guard.

Q. What is the number of the New England Telephone and Telegraph Company poles that are used by the Holyoke Water Power Company?

Mr. BROOKS. We don't agree that this man is proving titles to the poles, may it please your Honors.

The CHAIRMAN. No, sir.

A. 43.

Q. Those are how many guards and how many supports? A. 11 guards and 32 supports.

Q. Can you tell how many of the poles of the Holyoke Water Power Company have arms and brackets of the street railway company? A. 35.

Q. In that district, guards; and how many of the poles of the Holyoke Water Power Company have arms and brackets of the New England Telephone and Telegraph Company? A. 41.

Q. And, then, there is one flag pole, I believe, that is used? A. Yes, sir.

Q. That makes 1,277? A. It does.

Q. In regard to the iron poles, what in a general way can you tell us is their condition, so far as rust is concerned? A. Many of them are rusted. Certain ones that I have noted es-

pecially are rusted quite badly at the base for half an inch up from the base.

Q. That is, close to the sidewalk? A. Close to the sidewalk.

Q. And whether or not you were able to examine them all at that point? A. No; it was impossible, for instance, upon Dwight Street.

Mr. BROOKS. Well —

Q. Can you tell why? A. Because the street has been — The sidewalk has been resurfaced with tar, covering up that portion.

Q. What can you say in a general way of the wooden poles, as to the condition of the wooden poles, and general description? A. Many of them are rotted, and many of them are eaten.

Q. Yes. A. As enumerated in here.

Mr. BROOKS. What? I didn't hear that.

Mr. GREEN. Many are rotted, and many are eaten.

Q. Can you tell us anything about the poles, so far as having been cut down and reset —

Mr. BROOKS. Well, has he got them? All right, go ahead.

Q. What can you say about that,—of the Holyoke Water Power Company? A. Nothing from personal knowledge that they have been done so, yet there are some that have the appearance of being considerably shortened.

Q. Whether they are few or many that have that appearance? A. Quite a large number.

Q. In a general way, did you observe how the wires were strung,—whether they were tight or loose? A. In many places they sagged badly. In no place, hardly, are they in comparison with the other lines, of the street railway and —

Mr. BROOKS. How can that be competent?

Q. You are simply describing their tightness or looseness? A. Yes, sir; that they are all sagged.

Q. Did you notice the insulation, the condition of it? A. In few places it was gone or fragmentary,—tatters.

Q. Now, of the particular poles that you examined for their condition, those that you made personal examination of, will you tell us the result of the examination of those poles, and how much they were rotted, and what tests you made of them, so that we can understand clearly? A. Yes, sir. Upon Main Street, at the north-west corner of Cabot, there is a rotted pole that I tried a screw driver on —

By Mr. BROOKS.

Q. Where was that? A. Upon Cabot Street, the north-west corner of Main — no, I beg your pardon, the south-west corner of Main, — south-west. On this pole, as I say, I used a screw driver, as I did in all those tests. The screw driver was about 8 inches long. It had a blade upon it that was a quarter of an inch, perhaps it was three-eighths of an inch wide. The test every time was this width against the grain of the wood, not with the grain of the wood, but against the grain of the wood, shoving it in as I could with my hand, the strength that I have. On this pole I found it rotted two inches on an 11-inch pole.

By the CHAIRMAN.

Q. Two inches on what? A. On an 11-inch pole.

By Mr. GREEN.

Q. That is, at the point where you tested it at the base, did it go in two inches? A. It went in two inches. Then I took a measurement by rule.

Q. By an 11-inch pole do you mean the diameter of the pole? A. I meant the diameter. On Dwight Street, at the corner of School Street, I found an 11-inch pole rotted $3\frac{1}{4}$ inches. On the corner of Dwight and Pleasant Street I found an 11-inch rotted 4 inches. On Appleton Street, opposite Skinner's mill, on the same side, I found a 10-inch pole rotted 4 inches. Now I wish to say in regard to this pole that, while it had not the appearance of being rotted as much as these others, yet it was the deepest one that I have found.

Q. Now whether you have taken photographs of some of these poles that you saw as illustrative of their condition? A. I have; yes, sir.

By Mr. BROOKS.

Q. Have you gone through the list of poles that you examined? A. What say?

Q. Have you finished the list of poles that you examined?

A. Oh, no, not all of them.

By Mr. GREEN.

Q. You say you have some photographs here to illustrate the condition of the poles? A. I have; yes, sir.

By Mr. BROOKS.

Q. Who took the photographs? A. I did myself.

Q. Your own development? A. My own development and printing. (Exhibiting photographs mounted in book to Commission.) There is that pole that I spoke of at the corner of Dwight and Pleasant Streets. There it is rotted at the base. It is very faint, as you see it is on the north side, as almost all of these are; and it is hard to show them, some of them, but it shows it there. Here is another one that I enumerated on the corner of Dwight and School Street.

By Mr. GREEN.

Q. You have under each photograph put the location? A. I have put the location. Here is one at the corner of Main and Cabot Streets that I spoke of.

The CHAIRMAN. The pole there is larger than the cart, I see.

The WITNESS. Yes.

Mr. BROOKS. Of course that depends on the point of view, I suppose. Stand in a certain place, and you can make the rot look pretty large or pretty small.

The WITNESS. Those are all within ten or fifteen feet that I have enumerated so far. Here is one at the corner of Main and Cabot Streets, south-east. Here are two, one upon Sargeant Street near St. Jerome,—that shows it very much clearer; another one on Northampton Street near Mr. Heywood's,—that shows very much clearer. These are enumerated in the tabulation just about the amount that I used the screw

driver on. There is another one on Sargeant Street above St. Jerome.

Q. That is the rot at the bottom? A. The rot at the bottom. There is the one that I spoke of that seemed to be less to general appearance, opposite Skinner's mill; yet I drove the screw driver in on that further than I did on the others. There is another one at the corner of Summer and Cabot Streets. Those are all that I took as illustrations of them.

Q. Will you explain what these other photographs are now that you have here? A. I have illustrations here, naming where they are, of poles that are eaten. These are enumerated in the tabulation and the amount which, in my judgment, they are eaten.

By the CHAIRMAN.

Q. What is that? (Pointing to a photograph.) A. That is eaten; these are all eaten poles.

Q. What is that? A. That is a box around it. That really is an advertisement there. There is one that has been tinned after it has been eaten. Here is one that has been eaten, tinned, and then the tins eaten off, or one of the tins.

By Mr. BROOKS.

Q. When you say eaten, I suppose you mean horse-eaten? A. Horse-eaten; yes, sir. There is one that has been tinned; there is one that is eaten.

By Mr. GREEN.

Q. Now will you explain the photographs showing the poles and wires, just as illustrative of the way the services are carried? A. Upon page 145 I have shown here street railway poles that are used as supports for service over the railway wire to Cordis's building upon High Street, from the west side to the east side, between Cabot and Essex Street.

The CHAIRMAN. That describes itself largely. Just tell us what they are.

The WITNESS. Upon this west side here you see a Water Power Company's pole; nearer to you a Holyoke Street

Railway pole containing a support for the trolley wire and the guard wire above it; also two brackets holding the mains of the Water Power Company, with a Water Power Company arm up above, taking the service wire up on to this arm, carrying it above the guard and trolley wires of the street railway, across the street to the other street railway pole where the arm is shown there, and you will see the wires down to the store there. You will also note there, if you look at it with a magnifying glass if your eyes are not good, there is quite a sag there in those wires across. The rest of them show right along the same condition on the same street, enumerated as given.

Q. Different points in the same street? A. Different points on the same street. This condition you will find upon High Street and Main Street and Appleton Street especially, throughout the city.

Q. Of the wooden poles that you examined in order to find out how much they were rotted, have you tabulated your results? A. I have.

Q. Will you state them? A. I did state some of them here.

Q. Well, of the rotted poles, those that you examined? A. The summary, you mean?

Q. Yes, of those that you personally examined. A. Of those personally examined there were 147 poles that were rotted at the base, and of these 147 there were 16 poles that were rotted from one-quarter to three-quarters.

Q. And the rest? A. The number of poles examined that were eaten, there were 33 poles, and 17 of these were eaten from a third to three-quarters,—by horses, I take it, from appearance.

Q. You mean three-quarters through? A. Three-quarters through.

Mr. BROOKS. It must have tasted good.

The WITNESS. It looked as though it did,—good fodder for some horses. Of the iron poles examined there were 49 poles that were rusted at the base.

Q. Now, in a general way, can you tell us about the rest of the streets that you did not examine in detail, relative to the condition you found in these streets that you did? A. Knowing the space of time was so short that I had to appear here, I went around and looked at the other poles that I did not enumerate; and I found the proportion about the same as these that I have enumerated throughout the rest of the city.

Q. How would the condition in the rest of the city, so far as the service and feed wires, the use of other poles, compare?

A. Well, for service wires, I have enumerated probably the greater part when I say High, Main, and Dwight Streets; but for the main wires—mains—there are certain streets that they run upon other poles quite a little.

Q. That is, in the district that you have not enumerated?

A. In the district that I have enumerated.

Q. Will you take the map of the city of Holyoke showing electric lights and poles,—which is the plaintiff's exhibit in this case, if your Honors please. Have you Sargeant Street between Sycamore and St. Jerome Avenue? A. Yes, sir.

Mr. GREEN. On this map between St. Jerome Avenue and Sycamore Street there are, if I may be allowed to count them, Mr. Goulding, 1, 2, 3, 4, 5,—6 Holyoke Street Railway poles depicted between the light at the corner of St. Jerome Avenue and the light at the corner of Sycamore Street.

Mr. BROOKS. They are Water Power Company poles, just the same.

Mr. GREEN. I find, I say, on the map that you submit that there are 1, 2, 3, 4, 5, 6 poles depicted.

Mr. BROOKS. You said street railway poles.

Mr. GREEN. Did I?

Mr. BROOKS. You did.

Mr. GREEN. Then pardon me, I did not mean it. I say there are 6 Water Power Company poles depicted.

Q. How many street railway poles did you find there?

Mr. BROOKS. How is this of any consequence, may it please your Honors, how many of some other body's poles there are there? What bearing has it on any issue that is involved

here? If they can prove that we have not the poles we say we have, I think it is entirely competent.

The CHAIRMAN. What is the use of this, anyway? What is your purpose?

Mr. GREEN. We think that we have a right to offer it, and some of our witnesses will consider it of some importance, I think, if we have a system in the city of Holyoke that cannot stand up alone, if it is on poles of some other company.

The CHAIRMAN. Can you connect it with this Company?

Mr. GREEN. Certainly.

The CHAIRMAN. Very well, go ahead.

Mr. BROOKS. We simply say that we shall deliver all the poles that were specified on our map, every one of them.

Mr. GREEN. Yes. The question does not end here, Mr. Brooks, or, may it please this Commission, I might just as well state the point right here. We think it is a very serious matter if these poles have on them wires of the street railway company and the electric light company. If we have poles that we cannot remove or cannot replace, if somebody has a lien on our poles, or if our wires are on somebody else's poles, we think it enters very seriously into the valuation of our poles.

Mr. BROOKS. I would like to make a suggestion now. That is, when they show that other concerns have some lien on our poles, their contention may have some merit in it, but, until they do, it cannot have any possible merit. Suppose we permit the street railway company or the telephone company to put wires on our poles, permit it by our silence: pray tell me how they acquire any lien on the poles?

The CHAIRMAN. They lean on your poles.

Mr. GREEN. I do not believe it is incumbent on us to go in and explain. I think, if we show the existence of those wires on poles that they offer us, it is for them to show to this Commission the rights that the other parties have in them.

Mr. BROOKS. I never heard of any such rule of law as that, that you can show a lien by showing that somebody has a wire on your poles,— that, if they have a wire on your pole,

it is a lien until it is explained. I never heard of any such proposition of law.

Mr. GREEN. The condition of affairs shows that somebody else is using the poles which you offer us. You are in control of them, presumably.

Mr. BROOKS. We say now to them and this Commission that we shall turn over these poles depicted on our map with our wires attached to them, free from all liens.

The CHAIRMAN. Go ahead, Mr. Green.

Q. If you will proceed. Now, as a matter of fact, what poles did you find between Sycamore and St. Jerome Avenue on Sargeant Street? A. I found enumerated upon this plan six poles of the Holyoke Water Power Company. Upon examination I found one pole of the Holyoke Water Power Company and five poles of the New England Telephone and one pole of the street railway.

Mr. BROOKS. May it please your Honors, we would like our objection saved and exception saved to any attempt —

The CHAIRMAN. You object because he cannot —

Mr. BROOKS. He cannot prove title.

The CHAIRMAN. If that be so, they can prove it in some other way.

Mr. BROOKS. We should be very glad to have him.

Mr. MATTHEWS. It is for them to prove it, not us. They show a certain number of poles in the city of Holyoke by plan. They have not shown title to them. This witness is put on to show that their electric light system is carried, to the extent of this small section of it, on poles apparently belonging to some other corporation.

Mr. GOULDING. The trouble is "apparently belonging." He does not know anything about them.

Mr. MATTHEWS. Apparently belonging; yes.

Mr. GOULDING. He testifies to whom these poles belong. It may be a matter of real estate.

Mr. MATTHEWS. Oh, no.

The CHAIRMAN. Oh, no. Go on. We will take this evidence, but somebody will have to show —

Mr. GOULDING. What we object to is the competency of the evidence.

The CHAIRMAN. I understand that you object to the competency of it on the ground that he is not able to describe the poles as belonging to different companies; and, if they raise that question, Mr. Green, perhaps all this witness can do is to present a photograph to us of exactly what is on that street. You say there are six poles. He can describe those poles. It is not for him to say to whom they belong.

Q. You spoke of five poles as telephone poles. Will you describe those poles? A. Those poles are large, tall chestnut poles, the same style of pole that are used by the telephone company throughout the city. They had the telephone company's arms upon them, the majority of them, and the wires upon them of the telephone, which are smaller than the mains of the Water Power Company for lighting.

Q. Was there any name upon the pole or upon the poles?

A. I do not recall the name upon these poles.

Q. In height how do they compare with the poles used by the Water Power Company? A. The Water Power Company's poles, which are side of this and above and below, are considerably smaller.

Q. Now, the one pole that you have spoken of there as a Water Power Company pole, will you describe that? A. It is a round chestnut pole, short pole; just the height, of course, it was impossible to determine, but I should say it was a matter of, oh, 20 feet high.

Q. About how high should you say those 5 poles were?

A. From 8 to 10 feet higher, as I can faintly remember.

Q. This pole and the other poles that you speak of as Water Power Company poles, are they marked in any way? A. With the Water Power Company's arms upon them, and then they are painted the usual color that distinguishes the Water Power Company's poles.

By Mr. BROOKS.

Q. Do I understand you to say that the Water Power Company's poles, as you understand it, are all painted a certain

color? A. No, not all of them; not all of them. A goodly number; a goodly number.

By Mr. GREEN.

Q. Are painted how? A. Are painted a lead color.

Q. When you speak of the arms as distinguished from the poles, do you mean by that anything regarding the marking?

A. On many of the Water Power Company's poles a large majority of them are stencilled with "H. W. P. Co."

By Mr. BROOKS.

Q. On the pole? A. On the arms.

By Mr. GREEN.

Q. And where the Water Power Company's cross arms are used on these tall poles which carry the telephone wires, whether there were any markings on them? A. Just at the present time I could not tell you whether there were or not, but it was satisfactory to me at the time when I looked at it that they were Water Power Company's arms.

Q. At any rate, they carried what wires? A. They carried the Water Power Company's wires.

Q. What can you say of the poles which you have considered as street railway poles? what marks have they about them, what distinguishing features? A. The street railway wooden poles are mostly painted a dark green, and usually they have a number on them.

By Mr. GOULDING.

Q. A number? A. The number of the pole. This will be 95, another one 96, and sometimes a letter with it. Perhaps a letter is on every one. I do not remember exactly.

By Mr. GREEN.

Q. How long ago was it that you went over the street railway system? A. A year ago about this time.

Q. You were employed by the officials of this Company? A. I was employed by the Holyoke Street Railway Company.

Mr. BROOKS. How is this competent?

Mr. GREEN. I think it has some bearing as showing his familiarity with their poles, if he was employed by them.

The CHAIRMAN. We admit it.

A. It was about a year ago at this time.

Q. You did that in the employ of the street railway company? A. I did.

Q. Whether or not these same poles that you scheduled for the street railway company are there and on these streets where you went over this last two weeks? A. Yes, sir.

Mr. GOULDING. I suppose that polar expedition was merely to qualify him,— the first one? I do not know of any other bearing it has.

The WITNESS. Well, if I may explain —

The CHAIRMAN. Wait till the Court passes upon it.

Q. What is the distance between those two streets, going back to this place between St. Jerome Avenue and Sycamore Street? What is the distance between those two streets? A. Well, I really do not know.

The CHAIRMAN. Well, for a guess?

Q. Couldn't you tell us approximately? I guess we can scale it on this map, can't we? A. It is pretty hard for me to tell at the present time.

The CHAIRMAN. You can measure it, can't you?

Q. Haven't you a rule? A. No, I have not a rule with me. Well, if you have a scale on this, I can tell. (Measuring.) Between 750 and 850 feet, somewhere.

Q. And over how long a space, or over how much of that distance of 700 odd feet you have given us, do the wires pass on the five poles which you have described as poles of the telephone company? A. Almost the whole length of it.

Q. Where is the one pole that you considered a Holyoke Water Power Company pole? A. The next pole east to the light pole on the corner of St. Jerome Avenue.

Q. And from there on during the rest of the distance it is on the five poles described and the one pole — A. East; it is on the five poles.

Q. And the one pole of the Water Power Company? A. Yes, the one pole of the Water Power Company.

Q. Whether or not on the various streets, among the streets that you have detailed, you have attempted to find the number of poles described on this plan of the Holyoke Water Power Company? A. Yes, I have.

Q. Turn back, take the beginning of your.—

The CHAIRMAN. Did he find them or not? That is the proper question.

Mr. GREEN. That is just what I was going to ask him.

Q. Whether or not you could find the number of poles set out on that plan? A. In a number of cases, not.

Mr. GREEN. I think that is all I care to ask. I offer this book with photographs as an exhibit, and would like to have it marked, without asking to have it printed.

Mr. BROOKS. This goes in evidence, does it? Is it offered as evidence?

Mr. GREEN. Yes.

Mr. BROOKS. We will save our same objection, may it please your Honors, and exception, so far as any attempt is made by it to prove title in somebody else than the Holyoke Water Power Company. I think it is competent to prove the condition of the poles and the condition of the wires.

The CHAIRMAN. It is not admitted for any such purpose. We do not treat this witness as having any different knowledge from anybody else observing and coming in here and describing the premises.

Mr. BROOKS. Yes, I say so far as tending to show the condition of the wires and poles, I do not object to it.

The CHAIRMAN. I suppose that was why we admitted it. I suppose I could go out here on the street, and, if I have a ready eye, come back and describe to you the condition of the street. That would not settle any title to anything.

Mr. GREEN. There was a question to sum it all up, because I may need this question later on.

Q. Whether the description of the so-called telephone company's poles that you have given up here in this one particular spot applies generally to the poles that you have called throughout your work as telephone company's poles?

Mr. BROOKS. I do not quite —

Mr. GREEN. I just want to get a general description of the poles that are called telephone company's poles.

The CHAIRMAN. I think he has described the height of the telephone poles; and he says that that is the kind that he has treated as telephone poles all over the city.

Mr. GREEN. That is in, is it? That is satisfactory. I wanted to be sure that it was. That is all.

Mr. GOULDING. He said they were tall chestnut poles, such as the telephone company used throughout the city.

Q. Whether or not they have telephone company's wires on them? A. Yes; and one thing about the majority of the telephone poles, they are lettered "N. E. T.," — New England Telephone Company. Just whether these are, I do not remember now. As I say, I was satisfied in my own mind —

Mr. GREEN. Never mind —

Mr. BROOKS. I don't care —

Mr. GREEN. I did not ask him.

The CHAIRMAN. We admit the evidence. Do you object to the details of his work on his book?

Mr. BROOKS. So far as he uses it as a memorandum to refresh his memory as to condition of wires and poles, I do not know that we object.

The CHAIRMAN. It is admitted for that purpose.

Mr. GREEN. I should like to have it in; and possibly, if the question of title is of any importance later, after we have shown our friends the result of this work, some testimony might be introduced from the telephone company and from the street railway company that would make this absolutely competent in itself. We offer it now for what it is worth so as to get it in.

The CHAIRMAN. We will admit it for whatever it is competent.

Mr. GREEN. Of course, when we get up to Springfield next February, we shall desire to have the Commission go up and see this condition.

Mr. BROOKS. We shall, too.

The CHAIRMAN. Let us hope the snow will not be very heavy on the ground, so we can see the bottom of the pole.

Mr. BROOKS. Yes. We should want to have you take a screw driver along.

Mr. GREEN. A lead pencil will do for the base of most of the poles.

The WITNESS. You will want one at the corner of Sycamore and Sargeant Streets.

(The book containing the photographs and memoranda was marked on page 121 "Ex. 158, F. H. B.")

Cross examination by Mr. BROOKS.

Q. When was it you started out on what somebody has called the polar expedition? A. The 10th of December. I have put it right in —

Q. Well, I haven't asked that. And you were at it how long? A. Until to-day.

Q. That is, continuously? A. Continuously.

Q. Including holidays and Sundays? A. Well, hardly. Those generally are excepted.

Q. By the way, while I think of it, did you manage to catch a photograph of the beast that you suspected of having eaten these poles? A. Well, I have two or three of them. One is tied to the pole.

Q. Yes, one was tied to it. Could you judge how long ago these poles had been bitten into for the first time? A. No, sir; problematical.

Q. What? A. I say that is problematical.

Q. How many poles did you examine — A. I enumerate —

Q. — for the purpose of giving your testimony here? A. 1,277.

Q. 1,277 poles that you examined? A. Well, yes: not minutely, to find out whether they were eaten or not, but to get —

Q. I ask you how many poles you examined for the purpose of testifying in this case? A. Well, 1,277.

Q. How many poles of the Holyoke Water Power Company, as you understand it, are there in the city? A. I don't know. I didn't get that from the city.

Q. Have you been over this plan? A. No, sir, not to enumerate the whole.

Q. At no time have you been over the plan showing the pole lines of the Holyoke Water Power Company? A. Not in detail.

Q. On the streets of the city? A. Only as I have looked at it right here.

Q. That is what I mean; before to-day? A. No. Oh, yes, I had one of these plans; but I haven't been over it in detail, only those streets in which I have gone.

Q. How many poles do you say you examined and found were rotten? A. Well—

Q. Out of the grand total of all the poles? A. You will find it there in the book. I can't tell you now.

Q. Oh, you cannot without it? A. Not without the book.

The CHAIRMAN. 147, didn't you say?

Mr. BROOKS. I didn't catch that.

The WITNESS. I think it is on page 85, Mr. Brooks, somewhere along there.

Mr. MATTHEWS. Those are the ones which you examined with care.

The WITNESS. Yes.

Q. There were 147 poles that were rotted, as I understand? A. Yes: if you see it there, it is so.

Q. That is, you have 33 poles and 17 poles and 16 poles and 49 poles. Those are a part of the 147? A. Yes, sir.

Q. That is not in addition to the 147? A. No, sir.

Q. On page 85 of this exhibit. Now how much was the least rotten of the 147 poles? What was the least rot? A. Oh, I saw that they were rotten; and those that were not rotted in to any great depth, that I saw were rotted, I just noticed, as I explained, and check-marked that they were rotted.

Q. That is included in the 147? A. That is included in the 147.

Q. Wherever you thought one was touched, of course you included that? A. No, not —

Q. If it was touched with rot, you put it in your list, didn't you? A. No: as I explained, there were others that I didn't even examine casually that had the appearance of being rotted, that time didn't permit me to go to.

Q. 147 is all that you know about? A. The 147 is all that I told about.

Q. And that comprehends where you thought there was a touch of the rot up to one-quarter or three-quarters? A. Yes, sir, more than a touch.

Q. Well, what was the least rot that you measured? A. The least rot that I measured was given in there. Just what it was I cannot enumerate now.

Q. What was the least rotted of any of the 147 poles? Was it anything more than a touch of the rot? A. Oh, yes, a little more.

Q. Did you make the test on the 147? A. No, sir, only on those that are enumerated there.

Q. That is what I thought. I wanted to make that clear. A. Yes, sir.

Q. By the way, did you at any time for the city make plans of the Bridge Street gasometer? A. I did.

Q. And with Mr. Sawin did you make certain calculations? A. No, sir.

Q. With reference to excavation? A. No, sir.

Q. Did you go over his calculations? A. No, sir.

Q. With him or without him? A. No, sir, I told him what —

Q. I don't ask you what you told him. I am asking you if you went over his calculations — Mr. Sawin's calculations — with reference to the Bridge Street gasometer? A. Casually, this morning he spoke of it, and showed me his. I told him I couldn't remember what my figures were.

Q. Well, you made figures? A. I made figures; yes, sir.

Q. How long ago? A. I don't know. I think it was when all of the plans were made. Just when it was, I don't

remember. It seems as though it is a matter of two years or more ago.

Q. You made your calculations with reference to the Bridge Street gasometer and the excavation? A. Yes, sir.

Q. Cost, etc.? A. Yes, sir.

Q. Then did you go into the Holyoke Water Power Company's office and compare them with Mr. Sawin's? A. No, sir, I did not compare them with his.

Q. Did you go there with your calculations? A. I went there with one calculation, and told him —

Q. I don't ask you what you said. A. And showed it to Mr. Ranlet.

Q. Did you at the same time see Mr. Sawin's calculation? A. Mr. Ranlet showed me one on brick. That is all I know of.

Q. That was one you understood to be Mr. Sawin's? A. I didn't know whether it was Mr. Sawin's or whose it was.

Q. Wasn't Mr. Sawin right there when that was shown to you? A. I don't remember.

Q. And didn't you talk with reference to the two calculations? A. Possibly I did; I don't remember. All I remember now is talking with Mr. Ranlet on that.

Q. And didn't your calculations and his substantially agree? A. They did on —

Mr. MATTHEWS. I object.

Q. The Bridge Street gasometer?

Mr. MATTHEWS. Wait one moment. I pray your Honor's judgment.

Mr. BROOKS. So do I beseech it, also.

The CHAIRMAN. We will admit it.

Mr. MATTHEWS. Who were these estimates made for?

Mr. BROOKS. Made for the city, he says.

The CHAIRMAN. We will find out later.

Mr. BROOKS. He has said already.

The CHAIRMAN. Go on.

Q. Will you answer that question?

(The question was read by the stenographer.)

A. There is one that I remember of enumerating with Mr. Ranlet, and that was the brick; and we were very near together upon that.

Q. With reference to excavation, didn't yours and Mr. Sawin's substantially agree? A. I don't remember.

Q. You can't say? A. No, sir.

Q. And, generally, didn't the estimates of yours and Mr. Sawin's substantially agree? A. I don't recall, Mr. Brooks, that I ever showed him anything but the brick estimate; and I didn't recall that they had anything but the brick estimate there.

Q. Do you say that you didn't see Mr. Sawin's estimate for excavation and substantially his entire estimate for the Bridge Street gasometer? A. He showed me his —

Q. Didn't you see it? A. To-day there.

Q. No, but I mean long ago. A. No, sir.

Q. The day you were in the Holyoke Water Power Company's office, didn't you see Mr. Sawin's entire calculation?

A. No, sir, I did not, that I recall.

Q. Well, that is, you wouldn't say whether you did or not? A. I don't remember that I did.

Q. Didn't you and Mr. Sawin then and there talk it over, and didn't you come to a substantial agreement on everything that went to make up the Bridge Street gasometer? A. I will say no to that,—only certain portions.

Q. Where are the estimates that you made? A. The estimates, I suppose, are in with the plans. I haven't seen them for two or three years.

Q. Who took your plans? A. The City has them somewhere, I suppose.

Q. I understand you to say some of the poles of the street railway company have distinguishing marks and some have not; some of the poles of the Holyoke Water Power Company, so far as the arms are concerned, have distinguishing marks and some have not, and some of the poles themselves have distinguishing marks and some have not. Am I correct? A. Some of them have distinguishing marks that identify them

right off, as I told you, by figures and letters. Others have the arms on them.

Q. You are talking now about the Holyoke Water Power Company's or the Holyoke Street Railway? A. I am talking about everything, arms and wires.

Q. It is true, is it not, that some poles have distinguishing marks and some have not? A. They all have distinguishing marks.

Q. Every pole of the Holyoke Water Power Company, you say, has a distinguishing mark, do you, according to your theory? A. According to my theory it has a distinguishing mark, that it is clear in my mind that it is a Holyoke Water Power Company's pole.

Q. I understood you to give but two distinguishing marks. A. Those are the two.

Q. You said some were painted and some were not. A. Yes.

Q. You said some had yard arms with the Holyoke Water Company's initials on them and some had not? A. Yes, sir.

Q. What other distinguishing marks have what you call the Holyoke Water Power Company's poles? A. Where those are not given, the wires upon them alone as they come from one pole to the other and showing where the mains are tapped for the service wires distinguish them.

Q. Then you say that you distinguish what have not distinguishing marks; you pick them out by the wires that may be strung up? A. Not by that alone.

Q. Well, what other distinguishing marks, then, besides the wires and the two other instances that you have given, of paint and initials on the yard arms, are there? A. Well, general appearance, and instinct, perhaps.

Q. Oh, instinct? A. Yes, perhaps.

Q. You have an instinct as to poles. Well, I understand you to say that all kinds of wires are strung on various poles? A. Yes, sir.

Q. Well, then, does that aid you to distinguish whose pole it is, if there are several different wires strung on the same pole? A. No, sir. Generally, if you take —

Q. Well, now —

Mr. GREEN. Let him answer.

The WITNESS. I have not finished.

(The preceding questions and answers were read by the stenographer.)

Mr. COTTER. I should think you had better let him explain that. He has some means apparently of determining.

Mr. BROOKS. Read the question and answer, and let the witness complete it. Put it in.

(The preceding question was read by the stenographer.)

A. Not alone; generally, those poles are the ones that are very plainly marked, to my mind, the Holyoke Water Power Company's poles.

Q. Marked to your mind. Does instinct play a part there?

A. No, sir.

Q. Do you say there are no poles that have no distinguishing mark that do not bear more than one wire? A. I don't recollect now; I don't recall.

Q. You went over a limited district, as I understand it, for lack of time? A. Yes, sir.

Q. Now you say there are six poles on Sargeant Street between Sycamore and St. Jerome Avenue? A. Yes, sir, as given in your plan.

Q. As given in the plan; and you rather think that they do not belong to the Holyoke Water Power Company, as I understand your testimony? A. As I have it on my tabulation there, I believe there are seven poles, one street railway, five telephone, and one Water Power Company between the two lights.

Q. What distinguishing marks are upon those poles? A. I enumerated that before.

Q. What distinguishing marks are upon those five poles? A. The appearance of the pole, the height, the kind of pole, the arms, the wires upon the poles.

Q. Yes. Well, have you made any effort to discover by inquiry to whom those poles belong? A. No, sir.

Q. How many poles that are depicted upon that plan do you claim you couldn't find? A. On the whole plan?

Q. Yes. A. I don't know.

Q. How many poles do you say you couldn't find that are depicted on that plan? A. Oh, on that one place there?

Q. That is the only place — A. No.

Q. That is the only place where you say, according to your theory, they are depicted on the plan wrongly? A. No, sir.

Q. There isn't any other place where you find a difference between you as to whom they belong to, and what the plan is?

Mr. GREEN. Let him take the book.

Mr. BROOKS. Certainly.

A. One place especially that I have compared the two is upon Papinea Street.

Q. Where else do you say, according to your judgment of ownership, the plan disagrees?

Mr. GREEN. I don't know as you asked him for just what he found on that street.

Mr. BROOKS. I didn't ask him anything about that.

Mr. GREEN. He wants the name of some other street, without giving the details of that street.

Mr. BROOKS. I will change my question.

Q. Mr. Howes, how many poles, in addition to the poles depicted on the plan, do you think belonged according to your notions to the Holyoke Water Power Company? A. I found in some places, between the Ferry Road and Berkshire Street, on South Main Street,—I found two poles more than they called for.

Q. Have you made an examination outside of this limited area that you specified, certain streets, to determine whether or not the poles in the plan coincided with your ideas of ownership? A. Only in a limited way. I didn't even compare to a full extent through here, as I would compare, go through and then compare. I found that I hadn't time. Mr. Green told me I would have to appear here; and so I enumerated the rest, and had expected to go through this, but didn't have a chance.

Q. Now I think you said you found some poles of the

Water Power Company on the east side of High Street between Cabot Street and Suffolk Street. I think you said one was badly eaten or badly rotted there. A. I don't recall.

Q. On the east side of High Street, between Cabot and Suffolk. I may be mistaken. But on the east side of High Street, between two streets. A. Didn't I say Appleton and Suffolk? That is where I was enumerating.

Q. Well, I didn't so take it. Perhaps you did. What was that pole? A. At the north-east corner there is a light pole there, of Appleton Street and High.

Q. Now didn't you mention another one after that, on the east side of High Street? Was it between Division and Suffolk? A. At the south-east corner of Suffolk Street there is a light pole. There is only one there. I don't think that I enumerated that.

Q. Did you say that had anything the matter with it? A. I don't remember that I did. There is a pole that I spoke of —

Q. Do you find that pole depicted on the plan? A. On the east side?

Q. On the east side of High Street, at this point that you spoke of. A. I don't remember that I said that any of their poles were on the east side.

Q. Do you know of any poles of the Holyoke Water Power Company on the east side of High Street? A. Yes, sir, I think I do.

Q. Between — A. Not between that; no, sir.

Q. Or between Appleton and Cabot? A. Yes, sir. There is one —

Q. I don't ask you any more about that. Now do you know that it is common practice in cities of 40,000 or 50,000 people for several wires to be strung upon one pole, wires of various concerns, telephone and telegraph and electric lighting? A. I don't know anything about it.

Q. You don't know the slightest thing. Did you know that it had come to be desired and required by city governments? A. No, sir.

Q. That the wires should be strung as much as possible upon one system of poles? A. No, sir.

Q. Did you know that it was common to allow only one system of poles in a given street? A. No, sir.

Q. In the cities of this Commonwealth? A. I said I knew nothing whatever about it.

Q. You had made no observations to determine that? A. No, sir.

Q. Do you know whether or not the city government of Holyoke have passed any regulations with reference to stringing the wires? A. I am wholly in ignorance of it, if it is so.

Q. How many poles do you say there are of the Water Power Company's outside the district you examined? A. I don't know.

Q. You haven't any conception? A. No, sir.

Q. You cannot approximate. You say there is rust on some of the iron poles? A. Yes, sir.

Q. Did you specify the number? A. No, sir. Oh, well; yes, I did, in the summary of the number that I saw.

Q. You found rust on how many iron poles? A. That I took particular note of—I have given that as 49 poles that were rusted at the base.

The CHAIRMAN. As a matter of fact, if it doesn't interfere with your examination, I should like to know how many poles there are. The witness said he examined something over 1,200, I think, of all kinds, that belonged, as he thought, to the Water Power Company.

Mr. BROOKS. We will have it footed up in a moment.

The CHAIRMAN. There do not appear here to be more than about 1,200.

Mr. BROOKS. 1,255 we make it, both iron and wood,—981 of wood and 247 of iron.

The CHAIRMAN. Go ahead, Mr. Brooks.

Q. How many poles, of the poles that you thought were the Holyoke Water Power Company's poles, made of iron, did you notice rust on? A. I said 49, if I am not mistaken.

Q. I didn't hear what you said. A. 49.

Q. Did you make an attempt to determine the thickness of the shell? A. No, sir, impossible to.

Q. I didn't ask whether it was impossible or not. I asked if you made any attempt. A. That was the reason I didn't do it, because it was impossible.

Q. Well, did you make any attempt? A. No.

Q. Of any one of the poles? A. No, sir.

Q. Then you don't know how thick the rust was or anything about it, except that you saw rust. Am I right? A. In a certain way. I didn't measure it.

Q. By the way, have you ever known of any injury to person or property by the fall of any of the poles belonging to the Holyoke Water Power Company, in the electric light plant department? A. I don't recall any, sir.

Re-direct examination by Mr. GREEN.

Q. You were asked about some quantities. I wish to say I never had heard of it. It was the first I had ever heard of that myself. How long ago—

Mr. BROOKS. Does this go into the record?

Mr. GREEN. Well, I would like to know what was done with them. It is in the nature of a surprise to me to-day. I might want to recall the witness. I don't know.

Mr. BROOKS. I don't believe you will.

The CHAIRMAN. What was the question?

Mr. GREEN. In regard to quantities. There was some question asked in regard to whether he had not prepared some quantities. I wanted to ask him what it was and when they were handed in to the City.

Q. Can you give me any definite information as to how long ago it was that you figured on the quantities? A. You are speaking of the Bridge Street gasometer?

Q. Yes, sir. A. When I handed in my plan of the—

Q. I asked you if you couldn't tell me how long ago. A. I don't recall. It was handed in at the same time that all the

others were. Possibly I can tell you, I don't know — it has been so long since I did it. No, I cannot.

Mr. GREEN. That is all. I may want to ask something again.

Re-cross examination by Mr. BROOKS.

Q. What was the answer? A. I could not.

Q. Your estimate was handed in when the other estimates of the City were handed in, as I understand you? A. Yes, sir.

Q. And whose were the others? Do you know?

Mr. GREEN. I object.

The CHAIRMAN. It is immaterial.

Mr. BROOKS. We should like to be heard upon that, may it please your Honors.

The CHAIRMAN. If you will allow me to change my mind, if you convince me I am wrong.

Mr. BROOKS. Yes, certainly.

The CHAIRMAN. Go on: we will hear you.

Mr. BROOKS. Why haven't I got a right to put in whom the City had their estimates from, with the right to argue hereafter on the effect of the absence of the estimates? Is there any question, really, in your Honor's mind, but what it is perfectly competent?

The CHAIRMAN. What do you say to it, Mr. Matthews?

Mr. MATTHEWS. I should like to hear brother Brooks mention any authority for that question. I never heard of its being asked before.

Mr. BROOKS. I haven't any authority, as I know of, except that I think it is almost fundamental. If you employ a man, an expert, who makes a certain estimate, and do not call him, and employ somebody else in his stead, we have a right to argue from it.

Mr. MATTHEWS. I never heard of such a question being put in a court of law, in a land damage case or any other.

Mr. BROOKS. I never heard of its being rejected.

Mr. MATTHEWS. Can you mention a case where it was ever allowed, either at *nisi prius* or before the full court? I don't believe you can cite a case.

Mr. BROOKS. I am not obliged to cite a case when it is fundamental law.

Mr. MATTHEWS. Well, I simply say you cannot.

The CHAIRMAN. Let me see where you will land on that. Suppose I am getting up a case and go to half a dozen experts. I call four. I do not call the other two. Then you argue I was not satisfied with the other two?

Mr. BROOKS. I come pretty near arguing that, your Honor, and with considerable force. I argue that you pick out those who have made estimates most favorable to you, and that you reject the others because their estimates do not meet your ideas of what your case ought to have in it.

Mr. MATTHEWS. I say it is wholly immaterial, to start with; but we do not wish to have this question ruled out on brother Brooks's statement. And we object on another ground, and that relates to the method of proof. Mr. Brooks's hypothetical argument, that he is going to address with such force to the Commission at the close of this case, assumes not only that A has been put on the witness stand by us, but that B might have been put on for the same purpose that A was, but was not because his figures would have been higher or lower or otherwise unsatisfactory. Now that argument assumes that B was employed or retained for the same purpose as A, that he worked out results comparable with A's, and that we for our own reasons rejected them. How can A know what B is retained for, what he was asked to do, or what he did? We submit this is not the correct method of proof, if the fact itself be admissible as an independent fact, which we deny. They cannot put the expert on himself, for instance, and ask him if he was retained by the City of Holyoke in this case to prepare an estimate, and did prepare an estimate, and ask him what it was. They cannot do that. But, if they could—

Mr. BROOKS. I submit we can—

Mr. MATTHEWS. —they could not prove the fact by B

unless B was present at the conversation of retainer, and heard it, knew what its scope was, or unless the retainer was in writing and B had it in his possession. That isn't the way to prove the fact if the fact itself be admissible, which we deny.

Mr. BROOKS. I say, if I may be permitted a moment, that he has already testified to this, may it please your Honors.

The CHAIRMAN. You say, Mr. Matthews, that you couldn't have such a case. Brother Cotter says he has had a case in his practice.

Mr. MATTHEWS. Where they have actually allowed the witness to answer?

Mr. COTTER. I am not prepared to say that objection was made; but I made the inquiry, and I may feel influenced by that consideration. I made the inquiry, and the Court admitted it. I am not prepared to say it was under objection.

(The question was read by the stenographer: "And whose were the others, do you know?")

Mr. COTTER. In a matter of cross examination, having done that myself—I may be somewhat biased—the Court admitted it, I shall rule it is competent here.

Mr. MATTHEWS. In your case it was done without objection.

Mr. COTTER. I am not prepared to say it was done under objection; but I felt it was right at that time, and I feel still the Court was correct.

Mr. MATTHEWS. I do not see how the cross examination can go beyond this witness's qualifications. We do not deny Mr. Brooks can examine him on anything that relates to his qualifications. If the witness A has conferred with B, for instance, I think that fact can be brought out; but B's own estimate, if he has made one, does not seem to me to be competent.

Mr. COTTER. Of course we are not dealing at all with the weight of it. We hear it: it may not have any great consideration. But for my own part, the Chairman having asked me to rule upon it, I should not want to exclude that question on cross-examination, in that it has some tendency to show the attitude of the party,— what the party did.

Mr. MATTHEWS. I should like to save an exception, then.

Mr. BROOKS. They brought this out in re-direct examination.

The CHAIRMAN. You can answer the question.

Mr. MATTHEWS. If this question is admissible on the ground of what the witness himself said in reply to Mr. Green's question, why, the witness's reply was not responsive, and might perhaps be struck out; but we do not want to be barred from our objection that this is inadmissible simply for the reason that the witness himself has volunteered a statement which he was not asked.

The CHAIRMAN. We have not ruled that at all,—that it is irresponsive to what Mr. Green said.

Mr. MATTHEWS. Well, then, we would like to except to that.

Q. You say your estimate was sent in at the time of the other estimates to the City. Whose other estimates?

The CHAIRMAN. Personally, do you know?

A. Personally, I do not know of any.

Q. Then pray tell me why you said, in reply to Mr. Green, that your estimates went in when the other estimates went in?

A. From hearsay.

Q. Hearsay from whom? A. From the one or two others who submitted estimates.

Q. Who were they?

Mr. GREEN. I object. That is getting down to what somebody has told this man.

Mr. BROOKS. I do not ask him what was said.

Mr. COTTER. We don't think that is competent.

Mr. BROOKS. I asked him from whom he got it. He says, may it please your Honors, that he got his information from two others who submitted estimates. Now I ask him who those two were.

Mr. COTTER. You will do no harm in ascertaining who the persons were. I thought you went further.

Mr. BROOKS. No.

Mr. GREEN. I object.

The CHAIRMAN. Well, let us hear it.

Mr. MATTHEWS. He doesn't know these other gentlemen submitted estimates. He says he doesn't. We cannot be concluded by what a person who has not been on the stand —

The CHAIRMAN. If you get that answer, what good is it going to do you?

Mr. BROOKS. Am I obliged to declare myself now?

The CHAIRMAN. You needn't trouble yourself to any great extent.

Mr. BROOKS. It simply shows, perhaps, two other experts that they do not call here.

The CHAIRMAN. I don't know about that.

Mr. BROOKS. Well, it depends. He says there were two men who put their estimates in to the City, whom he obtained his information from.

Mr. GREEN. He didn't say that. He said that the men told him.

Mr. BROOKS. (To the stenographer.) Read that answer.

(The stenographer read the answer, as follows: "From the one or two others who submitted estimates.")

Mr. GREEN. Take the question and answer before that.

Mr. BROOKS. Now I ask him who those one or two others were.

The CHAIRMAN. Mr. Cotter thinks it is admissible.

Mr. MATTHEWS. We would like to except.

Q. Who were they? A. Mr. Lynch.

Q. Who is he? A. P. M. Lynch.

Q. Where does he live? A. Holyoke.

Q. What is he, an engineer or architect? A. Engineer and architect, seems to be.

Q. Who is the other one? A. That is the only one that I have heard say himself.

Q. Whom did you have in mind when you said the one or two others? A. Mr. Ellsworth.

Q. E. A. Ellsworth? A. E. A. Ellsworth.

Mr. GREEN. I suppose our objection covers this.

Q. He was an engineer and architect in the city of Holyoke? A. Yes, sir.

Mr. BROOKS. That is all I care to ask.

The CHAIRMAN. Mr. Green, do you want to ask anything?

Mr. MATTHEWS. I would like to ask him a question.

Re-direct examination by Mr. MATTHEWS.

Q. Whom did you submit your estimate to, or your plans to? A. To the city engineer then in power.

Q. Who? A. John J. Kirkpatrick.

Q. And how do you fix the time yourself? A. From what he said.

Q. How do you fix it with reference to years,—calendar years? Was it 1897 or 1898, or when? A. Well, I should say it was in 1898.

Q. You never were asked by Mr. Green or me to make any such estimate and plan, were you? A. No, sir.

Q. Never saw either of us in the matter, did you? A. No, sir.

Q. You were not asked by Mr. Callahan, city solicitor at the time, to make any estimates or plans, were you? A. No, sir.

Q. Did Mr. Lynch and Mr. Ellsworth do anything more than prepare plans, so far as you know? A. Not that I know of.

Q. Then by "estimates" you meant "plans"? A. Yes, sir.

Mr. BROOKS. I think you will agree you are somewhat leading.

The CHAIRMAN. It has a tendency that way.

Mr. MATTHEWS. Well, we have a right —

The CHAIRMAN. Oh, well, he has answered it.

Mr. MATTHEWS. It is not exactly leading as cross examination. I will state we are taken entirely by surprise

by this witness's testimony. We did not know until this morning he had ever been retained for making any estimates or plans; never heard of it until he stated it on the witness stand to-day. It is the first knowledge we ever had of the matter, and we do not understand it yet.

Q. Now you said that certain estimates were sent in, and you meant by Mr. Lynch and Mr. Ellsworth? A. Yes, sir.

Q. Do you mean that they made anything more than plans? A. I never saw a plan that Mr. Ellsworth made — all hearsay. I knew that Mr. Lynch made plans. I never saw any estimates.

Q. You knew Mr. Ellsworth made plans? A. From hearsay, yes.

Q. You didn't know he made any estimates, did you? A. No, sir.

Mr. MATTHEWS. That straightens the matter out, I think. Of course Mr. Ellsworth did make some plans.

Mr. BROOKS. You may think it straightens it, but we think it makes it a little more serpentine.

Re-cross examination by Mr. BROOKS.

Q. You didn't get up your estimates and plans, did you, without employment by somebody from the City? A. I told you that I had my orders from the city engineer; and, to state the time, —

Q. That is Mr. Kirkpatrick? A. Mr. Kirkpatrick; and, to state the time, it was during the last —

Q. I am not asking you about the time. A. — of Connors's administration. That would state it.

Q. The last of Mayor Connors's administration? A. Yes. That would perhaps locate it nearer than I can tell by dates.

Q. Lynch drew plans, and Ellsworth drew plans. Do you know if they submitted estimates? A. I don't know anything about it from personal knowledge at all — never talked with me.

Q. Did you get any information that they had submitted estimates?

Mr. GREEN. I object again.

Q. From Mr. Kirkpatrick, the city engineer?

Mr. GREEN. I object again.

Mr. BROOKS. I say that is competent.

The CHAIRMAN. I do not think so.

Mr. BROOKS. An official of the City.

The CHAIRMAN. It doesn't commit the City.

Q. Did you compare your estimates with theirs? A. No, sir.

Q. Did you ever see any comparison of your estimates and theirs? A. Never.

Q. Do you know the total of their estimates? A. No, sir.

Q. Or anything with reference to their estimates? A. No, sir.

Q. Whatever information you have received you received from the city engineer with reference to the estimates? A. No.

Mr. MATTHEWS. I object. He has not said he received any information with regard to estimates from the city engineer.

Mr. GOULDING. Counsel on the other side asked him a leading question. Now we have a right to cross examine him on that question.

The WITNESS. I said, "No, sir."

Q. Were there any of the others present when you were retained — A. No, sir.

Q. — by the Mayor or Mr. Kirkpatrick? A. Mr. Kirkpatrick was the one that retained me, upon High Street, one day alone.

Q. Did you ever see the other two in his company? A. No, sir.

Q. Either of them? A. No, sir.

Q. In connection with this case? A. No, sir.

Q. What did you mean when you said to me awhile ago that you put in your estimate when Lynch put in his estimate?

Mr. GREEN. I object. He never said any such thing. I object to it.

Mr. BROOKS. I say he did.

Mr. GREEN. I say he did not. No such statement was made. You have no right to put any such language in the mouth of the witness.

The CHAIRMAN. He didn't hardly put it that way. He didn't name the party at the time.

Mr. BROOKS. May it please your Honors, you allowed me to ask who the other one was, and he said Mr. Lynch. He had said before that he put in his estimate when the one or two others did.

The CHAIRMAN. Before he named Lynch.

Mr. BROOKS. But right afterward he did. I asked who, and he said Mr. Lynch.

The CHAIRMAN. What is your question?

Mr. BROOKS. My question is, "Why did you say to me that you put in your estimates when Mr. Lynch put in his?" Now I say he has said it.

The CHAIRMAN. Whether he said it the record shows. Answer the question, Mr. Witness.

(The question was read by the stenographer: "Why did you say to me that you put in your estimates when Mr. Lynch put in his?")

A. From hearsay of the time that I heard that he put in his.

By Mr. MATTHEWS.

Q. His what? A. His plans — estimates.

Q. What do you mean? Do you use the word "estimates" in the same sense in which you use the word "plan," or do you mean something different? A. I really mean plans, as I told you here that I know nothing whatever personally about any estimates, never heard a word one way or the other that either of those put in an estimate.

Q. Did you ever hear anything about any estimates having been made by Mr. Lynch or Mr. Ellsworth? A. No, sir, I did not.

The CHAIRMAN. Gentlemen, I think this subject has been exhausted.

Q. You don't think any estimates have been made? You never heard of them before? (No answer.)

Mr. MATTHEWS. The witness has evidently used the word "estimates" in the same way he has "plans."

By Mr. BROOKS.

Q. When you spoke of your plan and your estimate of the Bridge Street holder, did you mean, when you said "estimate," plan? A. No, I meant estimate on that; and I put in a plan at the same time.

Q. And, when you said "plan" with reference to the Bridge Street holder, you didn't mean "estimate," did you? A. Perhaps I was misleading in it.

Q. You are an architect and an engineer? A. Yes.

Mr. GREEN. That is all.

We have nothing further to offer, if your Honors please, until after the adjournment.

The CHAIRMAN. I don't like that at all, Mr. Green.

Mr. GREEN. Don't you?

The CHAIRMAN. And I certainly would not have gone into court yesterday if I had supposed this was going to be the rule adopted. Here is a day and a half lost.

Mr. BROOKS. Hardly worth coming down here.

The CHAIRMAN. You could send and get witnesses. You had witnesses here yesterday, who sat here to hear the testimony.

Mr. GREEN. Let me make a suggestion to the Court. We had intended to wind the week up with the rest of our gas case. Mr. Stedman, on whom we had counted once or twice, was telegraphed for; and he was not only ill, but he is very ill, and we cannot put him on.

The CHAIRMAN. That is an excuse for him, but you had two witnesses yesterday whom you might have put on.

Mr. GREEN. We dislike at the last day and a half of this hearing, and before a long adjournment, very likely six weeks,

to open up our water case and only go into it a little way, and then have to resume. Mr. Bell, who has been here, has not completed his schedule. He has been waiting for the various tests and the things we have been going through before his schedule is ready. The only schedule we have ready is that of Mr. Main. We could put Mr. Main's in, but it is a long schedule, which it will take some time to put in directly; and the cross examination will be of some length. The water part of this case we regard of great importance; and we dislike very much, with only that one schedule to fall back upon at present, to put in part of it and leave the water case suspended — Mr. Main's schedule — between now and six weeks from now.

The CHAIRMAN. I cannot conceive what harm can be done by that. This evidence is all printed; we don't carry it in our minds; we have to pick it all up. It does not make any difference whether we have Mr. Main's evidence. I, for one of the Commission, am going to stay here and hear this case.

Mr. GOULDING. I have devoted the rest of this week to this case. I was even going to sit Saturday, if the rest would; and it is a great loss to us. I do not want to charge my clients for a day and a half work when I am not here, and yet I have nothing else to do. I have postponed other things. It seems to me, if it is a mere question of dislike, it ought not to prevail, if that is all there is to it.

Mr. GREEN. It seemed to us almost that Mr. Main would have to give his testimony over again.

The CHAIRMAN. Why, Mr. Green, you were never more mistaken in your life. In the first place, it is a certain advantage, if I may say so, if you want to leave an impression on our minds and have a witness testify and then pick him up later. You have a multitude of witnesses. We have been hearing about this case lasting four weeks longer. Here is a day and a half knocked out. I think you had better put Mr. Main on or somebody else. There is a chance that you may complete Mr. Main, or may complete his evidence in chief.

Mr. GREEN. If your Honors feel that way, we will do so. I dislike very much to do it.

The CHAIRMAN. I understand. I would if I were you; but can we do otherwise? Would not we be more criticised for throwing over a day and a half in a case which there is so much desire to have finished? And what advantage can the other side get out of it? You put on Mr. Main. Mr. Brooks has six weeks before he has to cross-examine him. I will guarantee that he won't think of this case half an hour after he leaves the court room. He has another case on his hands.

Mr. BROOKS. You can give the guarantee, but it won't be fulfilled.

Mr. GREEN. It was not that at all, but it is the fact that Mr. Main introduces the most important part of our case; but I dislike —

The CHAIRMAN. Very likely: then we want to get the most important part of your case as quickly as we can. We want time to think it over. We carry this evidence in our minds: give it to us now. Can you get him by two o'clock?

Mr. GOULDING. All the evidence is printed.

Mr. MATTHEWS. If we can get through with Mr. Main, I think that a good deal will be saved; but suppose we only get part way through our direct examination?

The CHAIRMAN. You have a day and a half.

Mr. GREEN. We have two days and a half. This assignment covers next Monday, and I should like to sit next Monday and finish Mr. Main as far as we can.

The CHAIRMAN. Does this assignment cover Monday?

Mr. GREEN. Yes.

The CHAIRMAN. Very well, we will sit, then.

Mr. BROOKS. I said a long time ago I could not sit Saturday or Monday.

The CHAIRMAN. If the assignment covers Saturday and Monday, we are coming in then.

Mr. GREEN. I don't know how long it will take to examine Mr. Main in chief.

Mr. GOULDING. I did not understand the assignment

covered Monday, and I had made a special engagement for that day.

Mr. BROOKS. I do not think it does cover Monday. It says "to Monday, December 31."

Mr. MATTHEWS. That includes the day.

Mr. BROOKS. Well, if you are going to get a strict legal interpretation, it does; but it was understood by everybody that it did not cover Monday.

(Noon recess.)

